FINANCING DECISION, COST OF DEBT AND PROFITABILITY: EVIDENCE FROM NON-FINANCIAL SMEs IN THEUK

by

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Abstract

The aim of this thesis is to contribute to the existing empirical financial literature on the determinants of capital structure and adjustment process, cost of debt determinants and the affect of capital structure on profitability in the context of non-financial Small and Medium size Enterprises (SME) in the UK. In order to formulate the testable hypothesis different capital structure theories are reviewed.

A firm can choose equity, debt or both to finance its operations. The selection of optimal debt equity mix is a crucial issue in finance. The Generalized Method of Moment (GMM) is considered to control for simultaneous equation bias employing both firm specific and macroeconomic variables. For entire population of non-financial SMEs in the UK using Two Stage Least Square (TSLS) methodology, we focused on determinants of the cost of debt capital and the impact of capital structure on profitability.

Results indicate that findings are consistent with the pecking order theory, trade-off theory and agency theory. Our results show that short term debt plays an important role in capital structure, cost of debt and profitability of SMEs in the UK. Moreover, the short term debt is appeared to be more expensive for the manufacturing sector and more profitable for service sector whilst size and macroeconomic variables have a significant impact on leverage.

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Last but not least, I would like to express my biggest gratitude to my family for their understanding, encouragement and support. Despite the thousands of miles between us my parents always shared equally my problems and difficulties and they were always happy and proud of my little success and achievements. I am deeply indebted to them and will ever be grateful for them. Most especially to my son Danidu, words alone cannot express what I owe him for his encouragement, patient and love which enable me to complete this thesis.

I claim that I am the only person responsible for any remaining errors in this thesis.

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CHAPTER 1

1. INTRODUCTION

1.1 Motivation of the study

Capital structure is the one of the controversial issue in the theory of finance since the unrealistic assumptions of Modigliani and Miller (1958, henceforth MM, 1958). Since then much of the capital structure theories have advanced explaining different capital structure patterns and to provide empirical evidence relating to the explanatory power of these theories in the real world. However these empirical studies mainly based on the large firms and majority of these studies have largely been confined to United States. Though these studies have produced results of leverage related costs and tax advantage of debt the question is whether or not the various gearing related costs and benefits are economically important to have a significant impact on the optimal capital structure.

The most commonly accepted view is that firms are heterogeneous and each firm has a unique optimal capital structure which is determined by the characteristics of the particular firm. Previous studies (Marsh, 1982; Jalilvand and Harris, 1984) on capital structure have studied how firms choose the equity and debt mix and they have concluded that the important source of finance is the internal source. This is because internal finance is the cheapest source of finance which allows firm to undertake investment without any transaction costs, cost of bankruptcy, agency problems and asymmetric information compared to external finance.

Many small businesses seek financial help from family or friend because it starts out as an idea from one individual or more. If they are successful as they start as small establishment, there comes a time for the developing and expansion of the business. However, they often run

into problem of acquiring capital as they find it difficult to obtain capital compare to larger businesses. These difficulties that SMEs encounter can be related to some policy issues, incomplete range of financial products which are appropriate for their needs, transaction cost and the information asymmetry between firm and the finance provider. However, one of the most contentious issues in financing business is determining the debt, equity mix. To generalize and come up with theories and models explaining and predicting the most suitable capital structure, the academic world has spent much effort. In particular, Modigliani & Miller (1958) have proved that mix of debt and equity have no effect on firm value or the cost of capital assuming perfect capital market., Myers (1984) suggest that firms should balance the tax benefit of borrowing against the risk of financial distress, Myers & Majluf (1984) suggest that managers have superior information and it is generally better to issue safety security than risky ones, and Burger and Udell (1998) examine the financial growth cycle and capital structure and show that different capital structures are optimal at different point in the financial growth cycle.

A noticeable feature of most theories that discuss capital structure is the fact that they are usually developed to explain the capital structure of large firms. The question of whether these capital structure theories can be applied to small and medium-sized firms (SMEs) is still a puzzle. This is therefore investigated in the 3rd chapter of this study. We also study what factors determine the cost of debt and profitability of SMEs in the UK.

The theories generally suggest that the firms choose their debt equity mix based on the attributes that determine the various costs and benefits associated with debt equity mix. Better understanding of the cost of debt determinants should result in more precise debt equity mix

and create a better alignment between manager's compensation and shareholder value creation. The available empirical research in this area has lagged behind the theoretical research, especially in the context of SMEs. Therefore Chapter 4 of this study focuses on the determinants of debt capital which will contribute to the existing empirical literature.

The final empirical chapter (Chapter five) of this study examine the influence of capital structure on profitability of non-financial SMEs in the UK. Identifying the appropriate mix of capital structure would also change the ownership structure and control considerations and thereby encourage the managers to act more in the interest of the shareholders in order to ensure the firms' profitability is increased. As noted in the literature many of the previous studies are US based. Further, prior research does not consider the reverse causation from profitability to capital structure. Therefore we find it is important to study how this debt equity mix affects the firms' profitability.

1.2 Background

The purpose of our study is to empirically examine the determinants of borrowing decisions, and determinants of cost of debt and the influence of capital structure on profitability of non-financial SMEs in the UK. The methodology of this study consist of the review of literature, construction of hypothesis, collection of data, estimating and testing and interpretation of findings and finally generate conclusions relating them to the theory and the literature.

The main focus of our study will be based on previous empirical studies and on three major theories of capital structure namely the Trade-off Theory (TOT), the Pecking Order Theory (POT) and Agency Theory (AT). TOT assumes that an optimal capital structure is achieved

by trading off cost and the benefit of debt (Fama and French, 2002, Shyam-Sunder and Myers, 1999). Thus, companies equate the costs and benefits of debt and select the optimal mix of debt and capital which maximizes the value of the firm. PT suggests that firms have strong preference over internal finance (Myers, 1984) as that is the most profitable source of finance. In a need of external finance firms issue debt and when all other options are worn out they go for equity as a last resort. The AT's view, in the other hand, argues that agency problems occur due to incomplete alignment of the agent's and the owner's interests. That means separation of ownership and control generates agency cost. This is mainly due to the asymmetry of information between two parties, Jensen and Meckling (1976).

The issue of capital structure has been constantly debated in the lietrature (Harris & Raviv, 1991; Myers, 1984; Sogrob-Mira, 2005) and it is proved to be complex issue to investigate (Van der Wijst & Thurik, 1993). There are two different ways to finance the assets of the firm, through equity and debt. Moreover, there are several different kinds of equity and debts, such as common stock, preferred stock and retained earnings as well as bank loans, bonds, accounts payable and line of credit. The relation between debt and equity, often measured with the debt proportion ratio, represents the capital structure of a firm (McMenamin, 1999).

There are theories explaining the advantages for certain mixtures of debt (Modigliani & Miller, 1958), theories clarifying why some companies tend to avoid debts (Myers, 1984), existence of taxes and bankruptcy cost make debt relevant (DeAnegelo and Masulis, 1980), and some theories pinpointing that some companies put more focus on their strategic goals, whilst little attention is paid to rational profit maximizing (Barton & Matthews, 1989). The real world however, confirms that there is no single theory or model applicable to all

companies and their choice of capital structure (Barton & Mathews, 1989, Mathews, Vasudevan, Barton & Apana, 1994).

One of the main aspects of the choice of the SME sector is the role of SMEs in the generation of economic and social welfare. Given the fact that small businesses, and particularly innovative SMEs, become increasingly vital to economic development and job creation as the knowledge-based economy develops. SMEs boost competition and entrepreneurship consequently providing economy-wide efficiency and aggregate product growth. According to the Bank of England statistics (2004) show that firms with less than 100 employees accounted for 99.8% of the total business population, 44.7% of turnover and over 55% of employment in the UK. The great majority of all businesses in the UK (82%) had not sought external finance for their business at all in 2003. This proves that they are the engine of economic development. It is not surprising that there has been ongoing governmental concern against this background with regard to the source and availability of finance to SMEs (Cruickshank ;2000). However SMEs still face the difficult issue of access to capital for future development. This raises a question as to what factors influence the capital structure of UK SMEs.

However, most empirical studies focused on capital structure used data pertaining to large companies. Since most large firms can easily access finance nationally and internationally, it is not reasonable to accept and generalize the results of these studies especially for SMEs as they might not have the same facilities. In complying with the above view Ang (1992) argued that small privately held firms encounter different types of financing problems in comparison to large firms. Storey (1994) suggests that small firms find it difficult to obtain outside capital

and when they are able to obtain debt, it is at a higher interest rate. Berger and Udell (1998) confirm that raising external finance are even more pronounced for smaller firms. Theoretically these problems caused due to the information asymmetry and agency cost. The interest rates are actually the main instrument of the economy which cease or attract the external investments. This affects the companies in different ways, first it will elevate cost of finance and on the other hand hindering the profitability. Therefore it is timely important to study what financing sources do this companies prefer, what factors determine the capital structure, cost of debt and profitability of SMEs in the UK.

1.3 The contribution of the study

Our main contribution to the literature is mainly empirical. We study the capital structure, cost of debt and profitability of SMEs in the UK which has not been received much attention. While most researchers focus on large firms and financing as well as on financial constraints of US, We focus here on small and medium size enterprises in the UK, as we think that they can be one of the most influential players in the UK economy.

Our study shed some light on a specific area of finance namely capital structure, cost of debt and profitability. Previous literature has mainly concentrated on the cost of debt and determinants of profitability of large companies. This study, however contribute to the existing studies as we have incorporated macroeconomic variables and used a dynamic model to estimate the capital structure of SMEs in the UK. This is expected to highlight and gain the practical insight in to the financial practices of the non-financial SMEs in the UK.

Further this study extend the literature that short term debt is an important source of finance for SMEs in the UK. In particular short term debt has been the most popular source that funds the small firms. Thus in this study we have focused on the three different sectors micro small and medium firms in order to provide more comprehensive view on the finance behavior and impact of capital structure on the profitability and cost of debt of those firms.

1.4 The structure of the Thesis

Chapter 2 provides introduction, definition and importance of SME where we explain various definitions of SMEs, and we clarify the definition use in this study. The difference between the finance of SME and that of large business is investigated. We also shed the light on the importance of SME to the UK economy, manipulate data on SME finance, and finally outline overall capital structure of SMEs in UK where we focus on the tradeoff theory, pecking order theory, agency theory and asymmetric information.

Chapter 3 is the first empirical chapter, the subject is capital structure determinates of SMEs in the UK. We mainly concentrate on the factors which determine the capital structure of SMEs and the role of the adjustment process. We review the previous research on capital structure of SMEs and provide the details on firm specific, macroeconomic variables and adjustment to financial targets and explain firm specific and macroeconomic variables that influence capital structure. An innovative aspect of our study is that we use the dynamic adjustment model which enables us to test the dynamic adjustment preposition as other studies relating to SMEs in the UK use static model. Another important aspect of our study is that we use both firm specific factors and macroeconomic variables. The empirical approach

include panel Generalized Method of Moment (GMM) analysis. Results confirm that the pecking order theory, agency theory and trade off theory have an important role in explaining the capital structure of SMEs in the UK and macroeconomic changes are also significantly affecting the capital structure. Total debt ratio exhibits a positive relationship with macroeconomic variables. It could be interpreted as the country grows, leverage also increases as growth provide better financing opportunities for SMEs. It also suggests that firms have long term target debt ratio where they adjust to the target ratio relatively fast.

Chapter 4 turns attention to the cost of debt of non-financial SMEs in the UK as understanding the determinants of debt should results in precise capital budgeting decision and thereby understand why SME is difficult to attract external finance requirements. For this purpose we have to carry out empirical testing using panel date methodology covering all the SMEs in the population. The empirical approach includes Two Stage Least Square (TSLS) technique. To test how the size of the firm affects the cost of debt capital, we have divided the total sample into three sub sample; micro, small and medium. The results seem to support the notion that size matters for the cost of debt of SMEs in the UK. Results further shows that SMEs are highly depend on short term debt and strongly oppose to share the ownership.

The main issue address in the chapter 5 is to test how capital structure affects the profitability of non-financial SMEs in the UK as prior research does not take in to account the reverse causation from profitability to capital structure. Additionally, to capture impact of capital structure on various sectors, we have divided the sample initially as manufacturing and service and based on the extended sector classification. This enables us to understand how debt equity mix affects on the profitability of different sectors. We use again the Two Stage

Least Square technique for the estimations. Furthermore this directly addresses the spirit of the previous chapter and the role of short term debt on profitability. Results indicate that capital structure matters, the profitability and size is also one of the most important factor that determine the profitability of SMEs in the UK. Furthermore, consistent with the agency theory the argument of higher leverage is associated with lower profitability which is economically significant as well.

Final chapter, Chapter 6 concludes. We summarize the key findings of each empirical chapter and also discuss some policy implications and main future research ideas.

CHAPTER 2

SMALL AND MEDIUM SIZE ENTERPRISE SECTOR IN THE UK AND PRELIMINARY DATA ANALYSIS

2.1 Introduction

This chapter focuses on the overall capital structure of the SME sector in the UK and theoretical framework of the study in order to get a general understanding. The financing of SME is different from that of large businesses. It is not therefore surprising that empirical literature has shown different behavior of capital structure over firms and countries. Based on the general concept of SMEs in this chapter we attempt to evaluate the growth and role of SME in economy in terms of contribution to the GDP, employment etc. We also focus on the feature of our dataset.

This chapter consists of 4 sections. Firstly outline the theoretical framework, definition of SME and importance of the SME sector in the UK economy and the focuses on the general capital structure in UK.

2.2 Theoretical aspects of SMEs

A firm can be defined as a legally recognized organization designed to provide goods or service, or both to consumers, businesses and government entities (Sheffrin, 2003). Businesses are the prime concern in capitalist economies and most of the businesses are privately owned. A business is typically formed to make profit that will increase the wealth of its owners and grow the business itself. Except cooperative enterprises and state-owned enterprises the main objective of owners and managers of other businesses is to generate a

financial return which matches with the work and the risk they bare. Businesses can also be formed as not-for-profit or be state-owned. On the other hand a business can be grouped in to two groups of characteristics as quantity characteristics such as size, assets output, turnover, number of employees etc. and quality characteristics such as organizational structure, management quality where these qualitative characteristics in general are difficult to measure. As a result the most frequently used characteristics that have been applied to differentiate the firm are the quantity characteristics. In particular number of workers, sales and total assets of the firm are the most frequently used criteria.

As mentioned in the enterprise and industry publication of European Commission 2005, the first common definition for SME was adopted in 1996 with the intention of improving the consistency and effectiveness and to limit the competition. The definition has been widely applied thorough the European Union (EU) but in May 2003, in order to take account the new economic development, the commission adopted new recommendation where turnover and balance sheet total ceiling were introduced to the definition in addition to the number of employees This new definition replace since January 2005[1]. In this study we use EU definition and it is discussed in detail below.

2.3 Definitions of SME

For the purpose of studying the capital structure and financial choice of SMEs in the UK one major issue that we have to clarify is the way we define SMEs and also how they are different from large firms. In this section we discuss 3 different definitions of SMEs , United Kingdom,

[1] See enterprise and industry publication of European Commission 2005.

European Union and US respectively and finally we explain which definition and why we use the selected definition for this study.

2.3.1 United Kingdom

In the United Kingdom there is no one definition for what a SME is. Head count seems to be the common in most of the definitions. The Department of Trade and Industry define SMEs only based on the number of employees while British Bankers Association defines SMEs only based on the turnover. Section 382 and 465 of the Companies Act 2006 define a SME for the purpose of accounting requirements.

Table 2.1
SME definition - UK

Enterprise category	Headcount	Turnover	or	Balance sheet total
medium-sized	< 250	≤ £ 25.9 million		≤ £ 12.9 million
small	< 50	≤ £ 6.5 million		≤ £ 3.26 million

It is noted that even within the UK this definition is not applied universally.

2.3.2 European Commission

The European Commission has a third category called micro enterprises. A micro enterprise has a headcount of less than 10, and a turnover or balance sheet total of not more than €2 million.

Table 2.2
SME Definition –European Commission

Enterprise category	Headcount	Turnover	or	Balance sheet total
medium-sized	< 250	≤ € 50 million		≤ € 43 million
small	< 50	≤ € 10 million		≤ € 10 million
micro	< 10	≤ € 2 million		≤ € 2 million

Enterprises qualify as micro, small and medium-sizes enterprises (SMEs) if they fulfill the above criteria. In addition to the staff headcount ceiling an enterprise qualifies as an SME if it meets either the turnover or total assets ceiling.

The EU Commission established a SME definition based on four criteria (number of employees, turnover, total balance sheet and independence) in order to unify the large number of definitions used by different institutions of the EU member countries. Number of employees, is the first criteria and obligatory criteria and it is considered as the important and widely used in the EU member countries. Independence is an important aspect of the definition which has been included to avoid companies being controlled by other companies. Turnover and total balance sheet are the other important financial criteria. Considering these four criteria, the EU Commission in 1996 published a recommendation on the definition of a SME which states;

1. A company will be considered as a SME when:

   -the number of employees is less than 250 people,

   -either annual turnover is less than 40 million Euros per year or its total balance sheet is less than 27 million Euros,

   -it is independence as expressed in point 3 below.

2. When the differentiation between a SME is necessary, a company can be ranked as small when;

   -the number of employees is less than 50 people,

   -either annual turnover is less than 7 million Euros per year or its total balance sheet is less than 5 million Euros,

-it is independence as expressed in point 3 below.

3. A company is defined as independent if a 25% or more of its capital (or voting rights) do not belong to any other company or group of companies not considered SMEs.

4. When the differentiation between a macro company and the rest of SMEs is necessary, a micro company can defined as a company with less than 10 employees.

Most of the UK companies follow the European Commission Recommendation (ECR) and rank their company statistics according to the number of employees. From the institutional point of view, it seems that the European Commission has achieved its objective of unifying the different definitions of SMEs. Nevertheless in the field of research this definition has not been finalised. On the contrary, a large variety of criteria still exist. In this fashion, some research papers can be found in the UK that has used the number of employees as the criteria to define SME.

2.3.3 USA

The definition of small business in the USA is set by a government department called Small Business Administration (SBA) Size Standard Office. SME definition of US considered individual industry size instead of applying one single definition for all industries like in UK and EU[2]. This variation is intended to better reflect industry differences[3]. To sum up in this

[2] See University of Strathclyde, Glasgow, SME definition.

[3] The most common size standards are

- 500 employees for most manufacturing and mining industries
- 100 employees for wholesale trade industries
- $7 million of annual receipts for most retail and service industries
- $33.5 million of annual receipts for most general & heavy construction industries

study we have adopted the European Commission definition. Different countries use different definitions for SME. In the US for specified industries the upper limit for employment can be 1000-1500, for small firms is 250 and for medium firm 500 employees. Similarly the other criteria, annual turnover can vary from US$0.75mn to US$33.5mn. Canada uses the term SME to refer to business with fewer than 500 employees while classifying firms with 500 or more as large businesses. While European Commission introduced a definition based on employment, turnover and asset size some countries in the EU still use their own domestic definition for their statistics.

2.4 The difference between SME and Large Business Finance

There are some distinguished qualitative differences between the financing of small firms and large firms. The small businesses generally only have access to private equity and debt markets, whereas large firms have access to the public markets. It is argued that information asymmetry is the main reason that small firms have no access to the publicly traded securities. In addition to that publicly traded securities are associated with significant amount of other additional cost which will be difficult to afford to a small firm. Those costs are essentially fixed and create economies of scale in issue size. SMEs find it is difficult to overcome the economies of scale in issue size as there is a positive correlation between issue size and asset size of the firm.

- $14 million of receipts for all special trade contractors
- $0.75 million of receipts for most agricultural industries

Approximately one quarter of industries have a size standard that is different to those listed above. Refer to the SBA website for the full table of size standards. The most recent scheme was originally produced in 2002, but has had amendments integrated on a rolling basis.

The financing of a small firm is transparently different from that of larger firms. Large firms have ready access to the capital markets, such as the London Stock Exchange, where there is no access to the vast majority of small firms. The lack of equity capital invested in small firms forces these firms to search for other sources of finance, which tend to be bank lending and other types of financial products. There have been constant concerns that the finance markets do not always fully meet the needs of small firms who can find it harder than large firms to acquire finance that is available, suitable and reasonable. But there are mechanisms which widen the access to finance specially targeting at SMEs such as Small Firm Loan Guarantee (SFLG) which help small businesses to find the funding opportunities even without the required collateral. But most of the young firms are not aware about these facilities and more of them are reluctant to use these facilities[4].

However significant evidence does exist which suggest that there are specific problem areas within the UK economy. A number of groups face distinguish challenges when accessing finance, including women setting up businesses, ethnic minority businesses, entrepreneurs from deprived backgrounds and high technology businesses. British Bankers Association (2009) shows that SMEs in the UK remain dependent on the bank finance and continued weakness in bank lending remains a challenge for those borrowers, though according to British Bankers' Association statistics, net lending by banks to UK small businesses has been positive during 2009 despite weakening in recent months.

[4] See Small business survey, The small business service 2005.

The most prominent banking providers in UK are the big four[5] which provide wide range of retail banking to investment banking for both business and personal customers. SME sector is largely banked by these banks and internet based banking providers are not much active in the SME market. Building societies mainly offer commercial mortgages and now they have expanded the range of services they offered. Irrespective of these changes still the big four are dominant the market. Through the government help Small Business Service offers small business loan guarantee scheme[6] where the loan is applied through the retail bank and 75% is guaranteed by the government. In the context of SMEs a large number of research (Wilson 2007, Deakins et. al, 2008) suggest the dissatisfaction of small firms about the availability of finance because of information asymmetry. Fraser (2008) suggests that past difficulties are gradually improving through the better communication. Further Fraser (2008) shows that 69% of SMEs in the UK have a single banking relationship and in the recent past the SMEs communicate with the bank through internet and there are less face to face contacts between banks and business owners which would not be expected to enhance the quality of the relationships with banks and help flow of finance to the firm.

2.5 Importance of SME in the UK Economy

SMEs play a vital role in the economy, providing new ideas, products, services and jobs. SMEs have been in the focal point for a few decades and a subject for the number of research articles. The SMEs which have in recent years proved themselves to be the engines of economic growth and the principle source of new employment. The ability to exploit new

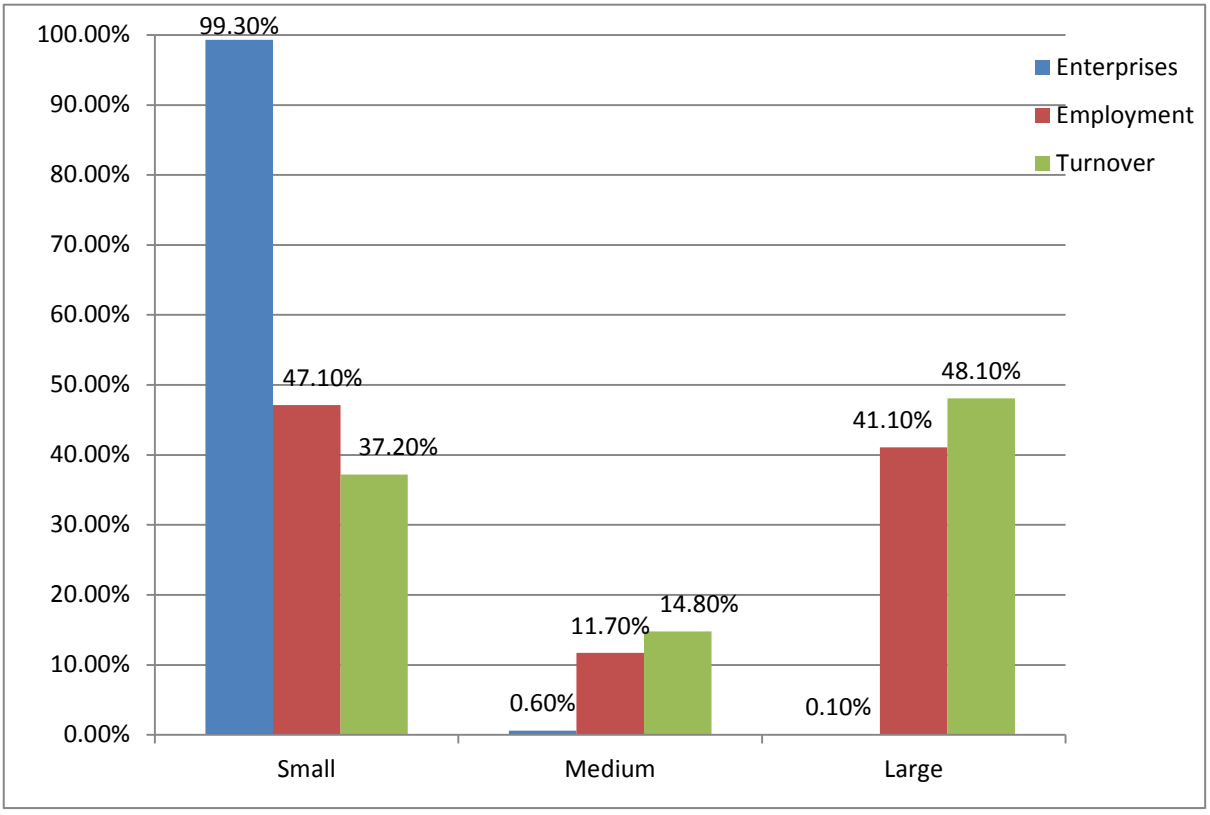
[5] Barclays, HSBC, RBoS-Natwest and Lloyds_TSB. (Certified Accountants Educational Trust, London 2006)

[6] This scheme supports the firms with insufficient security to obtain bank loan finance.

technologies and to respond quickly to changing market needs give SMEs a key role in the success of the European Economy.

The figure 2.1 shows the distribution of employment, turnover and enterprise across the size bands small, medium and large for the year 2008.

Figure 2.1
Distribution of Enterprises across size

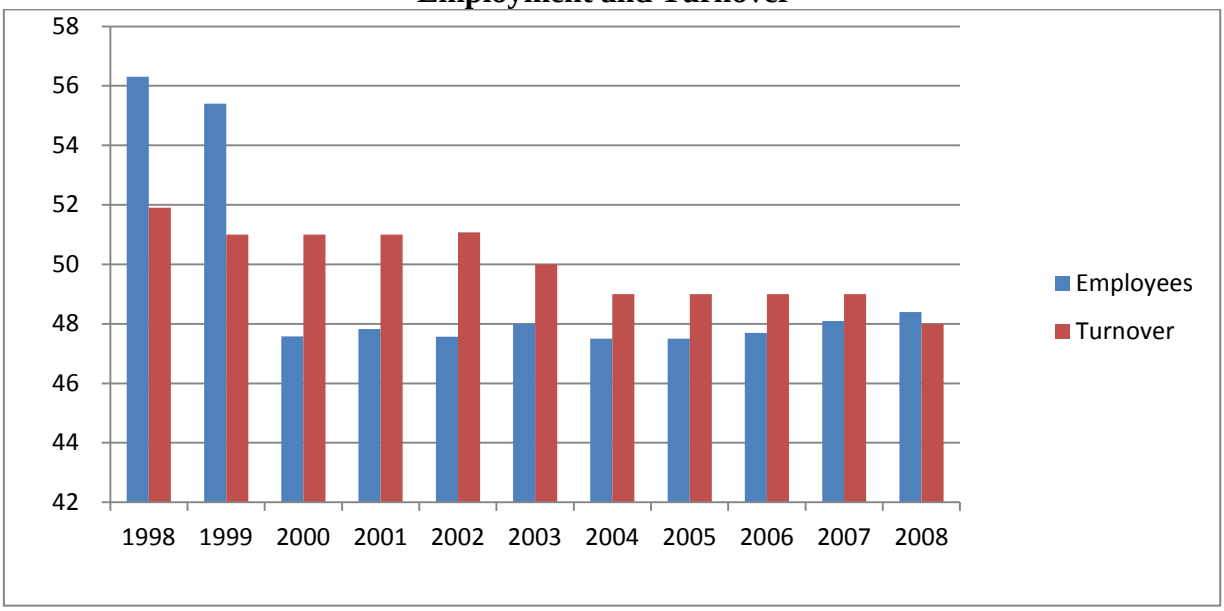


The above figure shows the Distribution of Enterprises across size enterprises, employment and turnover. Source: British Chamber of Commerce 2008.

According to the Department for Business, Enterprise & Regulatory Reform (BERR)'s Enterprise Directorate Analytical Unit, in 2008, the UK economy is 99% SMEs. Out of 4.9 million UK businesses less than 1% was large corporations. SMEs are gaining a significant share of the total output in the private sector over the last decade. In terms of UK turnover and Gross Domestic Product (GDP) UK SMEs account for 1.48 trillion pounds. Employing over

14 million people in the UK, they also account for 85% of the 2.3 million extra jobs created by new businesses in the private sector. The following figure shows the turnover and the employment in SMEs in the UK for the period of 1998-2008. This figure shows the turnover as a percentage of total annual turnover of the economy and employment shows the employees as a percentage of total number of employees in the economy.

Figure 2.2
Employment and Turnover



The above figure shows the employment and turnover from 1998-2008 of SMEs in the UK. Source: Department of Trade and Industry: 2008

As can be seen in the figures above, there is a down turn of the employment and turnover throughout the period. In fact all SMEs outperform the large UK corporations in terms of productivity despite having minimal resources, little support and being largely ignored compared to the large firms. Large corporations only account for only 50% of UK turnover and there is substantial evidence that the UK economy is supported by SME performance and that improving performance will have a substantially positive effect on entire UK economy.

According to Organization for Economic Corporation and Development (OECD) recent[7] figures ranked UK as the third highest GDP growth in the G7 over the period 1996-2006. In 2007 UK reported the strongest estimated growth among G7. However, since economic conditions are very likely to worsen during 2008 as uncertainties and challenges facing SMEs are increased due to the credit crisis. Small firms will be particularly vulnerable as lenders become more risk averse and even the interest rates fall especially small firms find harder and expensive to borrow. But, having said that the UK is still considered as one of the most attractive location[8] to do business (World Bank, 2011).

2.6 Data on SME Finance

Even in the UK a very few surveys have been conducted on small businesses and the data was not widely circulated among researchers. The lack of data disrupts a complete analysis of the financial situation of the SME. This is the reason why SME has been one of the most under researched areas in finance. In the UK there are about 4.8 million enterprises in 2008 but only less than .1 million small firm data can be accessed. The Bank of England and Department of Trade and Industry maintain data relating to small businesses. The Department of Trade and Industry brought all the government information services for the UK SMEs under the umbrella of a single website in 2003. The site, which has been built in collaboration with other Government departments and agencies including The Treasury, Inland Revenue, Customs and Excise and Companies House, carries information on grants and support schemes and guidance on issues such as employment law, tax and to enable anyone who

[7] 2007

[8] UK is ranked 4 out of 183 economies.

wants to set up in or improve the performance of their business with easy access to the relevant information, advice, funding or training available from the public, private and voluntary sectors.

2.6.1 Data Sources

This section explains how the data has been collected and to address the research questions. The data used in this thesis has been obtained from FAME data base and Bank of England covering the period 1998-2008. All the firm related details are collected from FAME data base and all the macroeconomic data is collected from Bank of England. FAME contains comprehensive information on companies in the UK and Ireland. FAME database is collected by Jordans Bureau Van Dijk commercial use and is constructed from the profit and loss and balance sheet data. The database consists primarily of unquoted companies data and some quoted companies on Alternative Investment Market (AIM) and Off-Exchange Market (OFEX) where this database includes mainly non-listed firms in the UK. Firms that had at least 3 observations during the period 1998-2008 were chosen. Samples have an unbalanced panel structure and the number of years of observation varies between 3 and 11.

Table 2.3. Data and Variables

Raw Data	**Transformed Data**	**Name of variable**
Turnover	Log of Turnover (Turnover1- Turnover 0)/ Turnover 0	SIZE SALES GROWTH
Total Assets	Log of Total Assets	SIZE2
Tangible Assets	Tangible Assets/Total Assets	CA
Intangible Assets	Intangible Assets/Total Assets	FGO

EBIT	EBIT/Total Assets EBIT/Total Assets-Current Liabilities Standard deviation of EBIT/Total assets	Profitability/PROFIT ROCE OR
EAIT	EAIT/Total Assets	ROA
Debtors	(Debtors-Creditors)/Total Assets	Net Debtors
Creditors	(Debtors-Creditors)/Total Assets	Net Debtors
Depreciation	Depreciation/Total Assets	NDTS
Total Debt	Total Debt/Total Assets	DR TDA
Long Term Debt	Long Term Debt/Total Assets	LDA
Short Term Debt	Short term Debt/Total Debt	STDTD
Equity	Debt/Equity	Gearing GEARINGRATIO
Current Assets	Current Assets/Current Liabilities	LIQUIDITY LIQUIDITYRATIO
Current Liabilities	Current Assets/Current Liabilities	LIQUIDITY LIQUIDITYRATIO
QUI Score	0, 1 Dummy variable	CREDITSCORE
Audit Report	0, 1 Dummy variable	AUDIT DUMMY
Incorporation Date	0, 1 Dummy variable	AGE
Interest Cost	Interest cost/Total Debt	COD
GDP Growth Rate	GDP Growth Rate	Grate

Inflation	Inflation rate-Annual percentage change in the consumer price index	Inflation

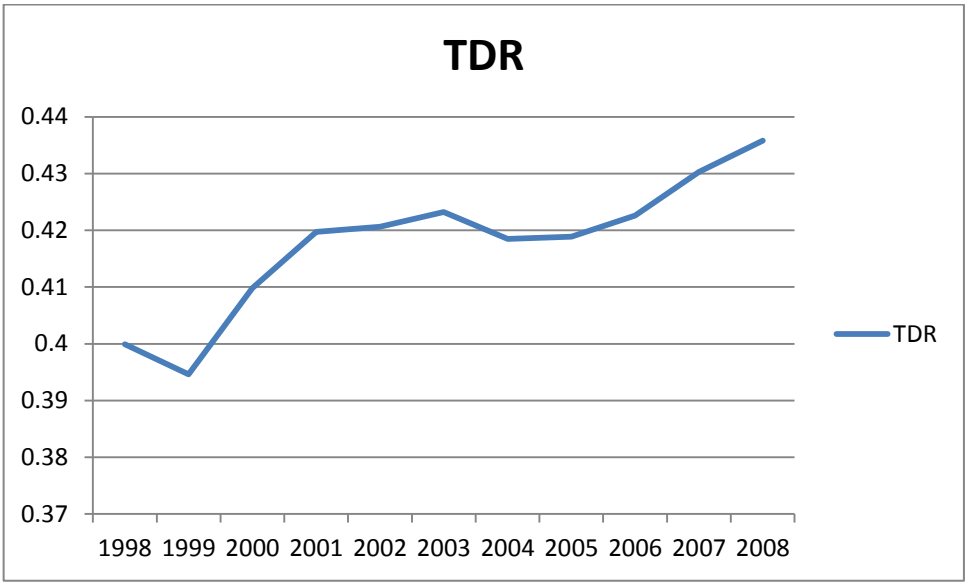
In this study we have considered private limited firms[9] which satisfy the EU definition for SME. We focus only on the non-financial SMEs in UK. The database lists all the private limited firms with available accounting data at the time of downloading. The sample used for the estimations are explained in each chapter in detail.

2.7 Descriptive Statistics

This section shows the preliminary data analysis on firms' financial perspective for the study period. We have presented detailed financing pattern of the firms throughout the period of study focusing on the selected annual key financial ratios during the period as the annual ratios shows the trend of the financial impact of changes in economic conditions. We have also shown the financing behavior of each sector for each year to observe the specific financing manner across sectors.

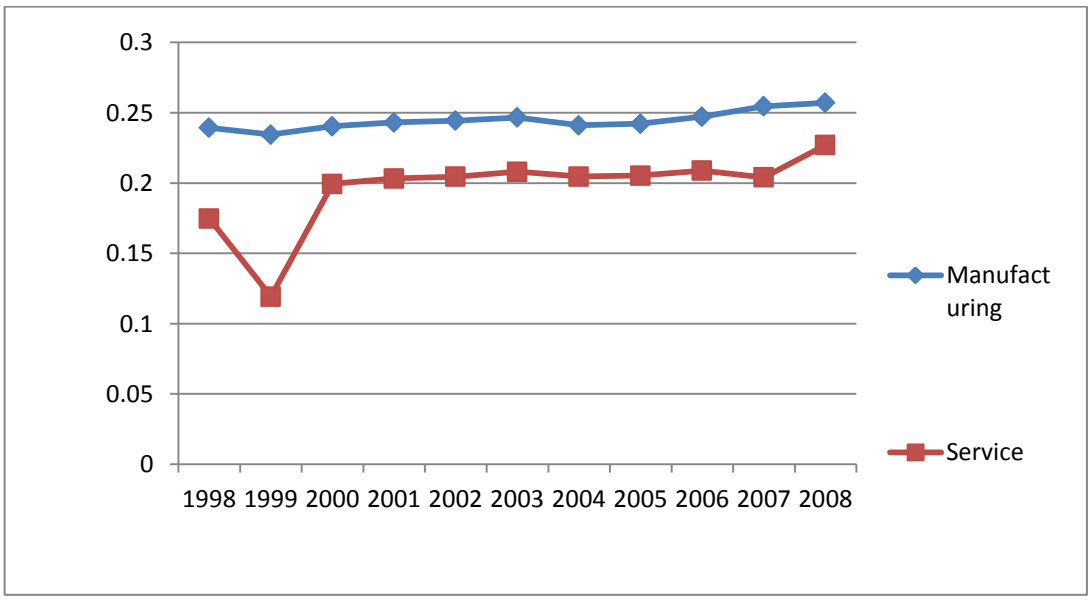
[9] In order to keep our study focus we drop Unlimited, Public AIM, Guarantee, Limited Liability partnership, Public not quoted, Public Quoted OFEX, Public quoted inv. Trust and public quoted.

Figure 2.3: Leverage behavior of UK SMEs



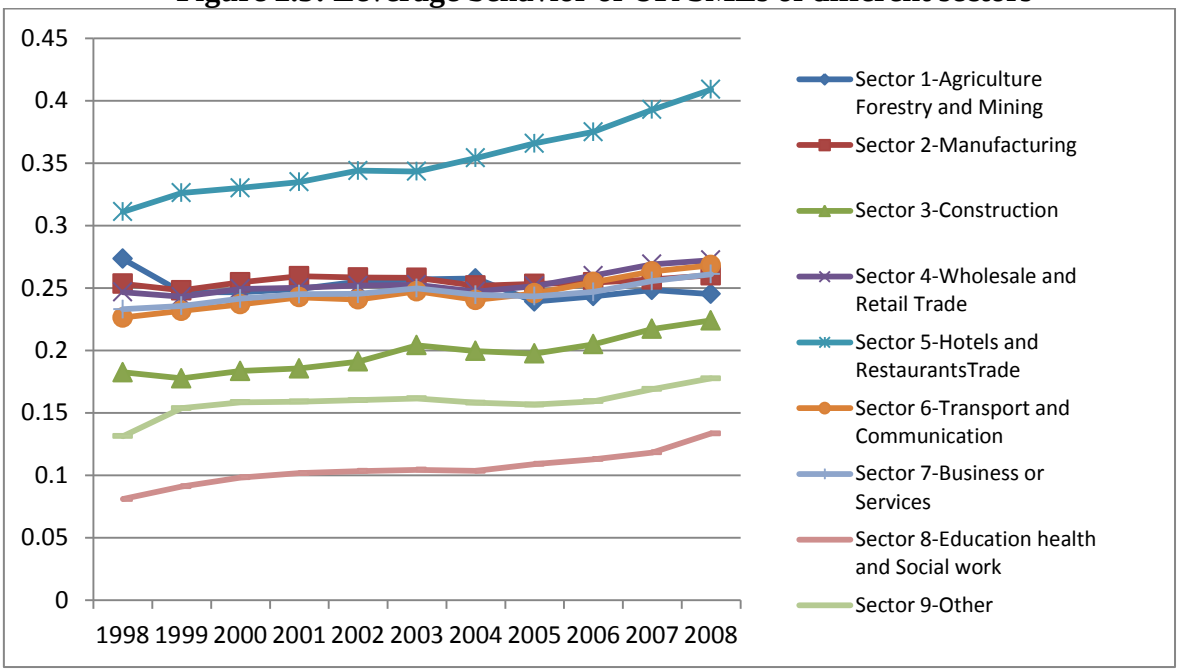
The figure shows the Leverage behavior of UK SMEs. Data collected from FAME database for the period of 1998-2008. Leverage is measured by total debt over total assets.

Figure 2.4: Leverage behavior of UK SMEs of Manufacturing and Service sector



The figure shows Leverage behavior of UK SMEs of Manufacturing and Service sector. Data collected from FAME database for the period of 1998-2008. Leverage is measured by total debt over total assets.

Figure 2.5: Leverage behavior of UK SMEs of different sectors



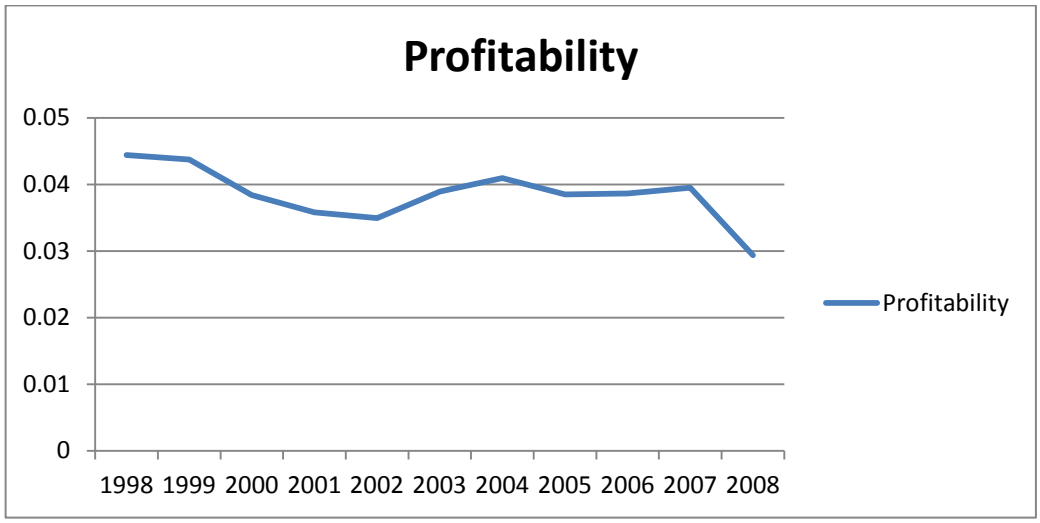
The figure shows the Leverage of UK SMEs of different sectors, agriculture forestry and mining, manufacturing,, construction, wholesale and retail, hotels and restaurants transport and communication, business or services education health and social and other. Data collected from FAME database for the period of 1998-2008. Leverage is measured by total debt over total assets.

Graph 2.3 shows the behavior of total debt ratio (Total debt/Total assets) from 1996-2008 of SMEs in the UK. The graph shows that there was a decrease of firm debt ratio at the beginning of the study period and in the late 1990s it has started increasing gradually until 2003. From 2004-2008 again there is a rise in the ratio. After a slowdown in 2003 the UK SMEs looked to be employing more debt from the year 2004. This does not show any immediate effect of 2007- 08 economic crisis.

As we have considered the different sectors in this study financing behavior of each year and the occurrence of specific financing method across the sectors is interesting to describe. Therefore we graph the financing patterns of different sectors. Figure 2.4 shows the TDR for Manufacturing and Service sectors, while the figure 2.5 shows the TDR for each different

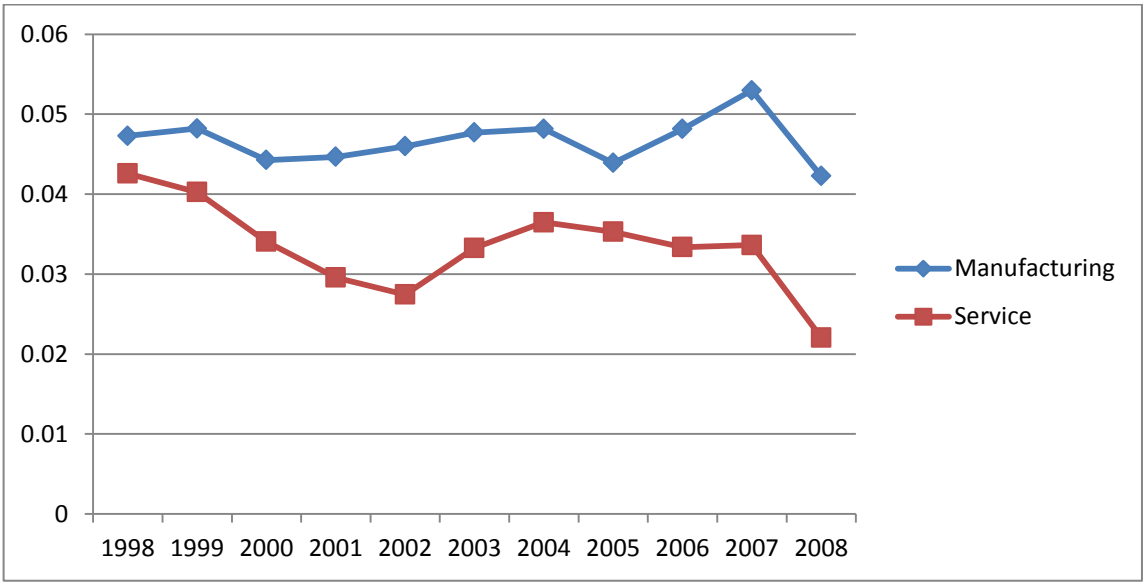
sectors .The graph 2.4 shows that the Manufacturing sector have the highest debt financing and Hotel and Restaurants Trade use the highest debt capital while Education Health and Social work sector utilize the lowest among the different sectors. We observe that from 1998-2008 except agriculture, forestry and mining sector all other sectors have increased the usage of debt capital. We also notice that Service sector debt ratio has increased sharply in 2007.

Figure 2.6: Profitability of UK SMEs



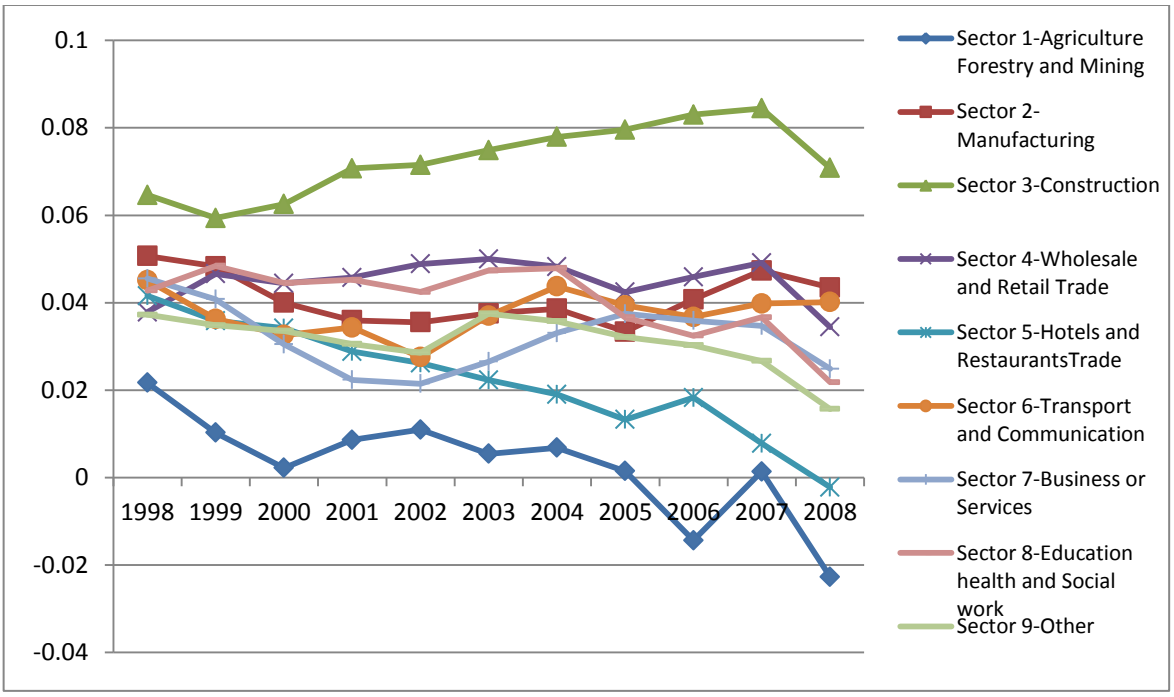
The figure shows the Profitability of UK SMEs. Data collected from FAME database for the period of 1998-2008. Profitability is measured by EBIT over total assets.

Figure 2.7: Profitability of UK SMEs of Manufacturing and Service sector



The figure shows the Profitability of UK SMEs of Manufacturing and Service sector. Data collected from FAME database for the period of 1998-2008. Profitability is measured by EBIT over total assets.

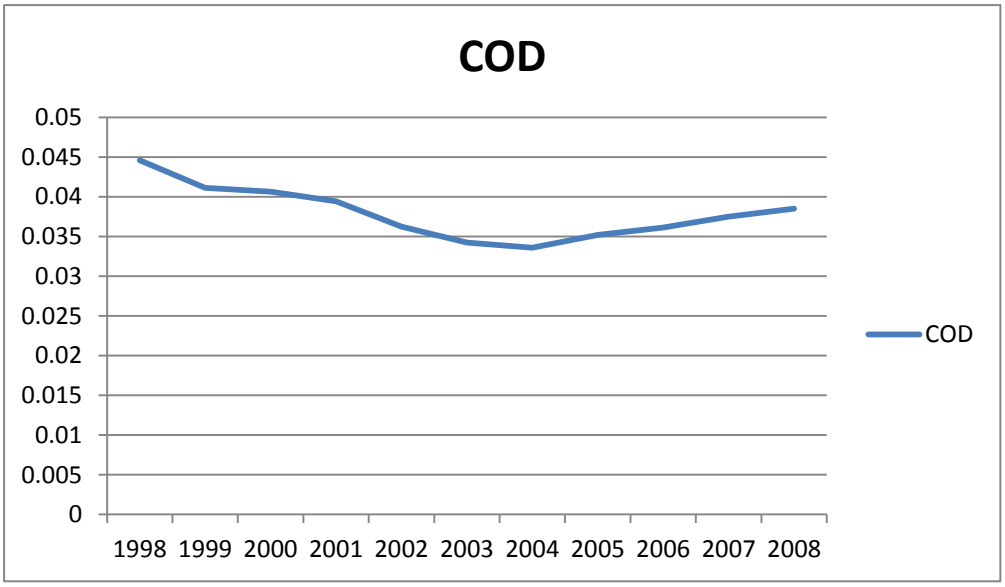
Figure 2.8: Profitability of UK SMEs of different sectors



The figure shows the Profitability of UK SMEs of different sectors, agriculture forestry and mining, manufacturing,, construction, wholesale and retail, hotels and restaurants transport and communication, business or services education health and social and other. Data collected from FAME database for the period of 1998-2008. Profitability is measured by EBIT over total assets.

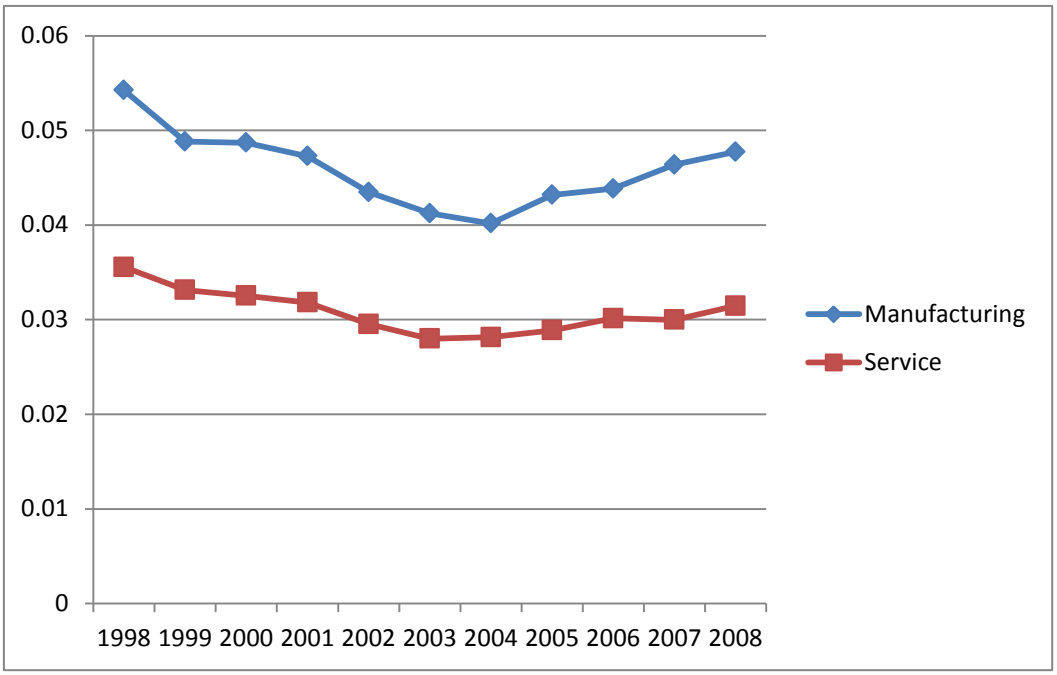
Next we consider the profitability (ROA) of SMEs in UK which shows that there is a fluctuation throughout the period as shown in the above figure 2.6, 2.7 and 2.8. The graph 2.6 shows that there was a reduction in profitability ratio immediately after the crisis in 2007-08. This is justified in the other three graphs (Debt, COD and Size) where debt financing has increased during the period as a result of that cost of debt increase and decrease the return on assets during the crisis period. We also notice that profit of all the sectors drop down by the end of 2007as shown in figure 2.7. Construction sector shows the highest profitability while Agriculture, Forestry and Mining sector reports the lowest profitability across sectors. Overall profitability of SMEs as well as profitability of Manufacturing and Service sectors also shows the same pattern throughout the period and by the end of 2007 until 2008 it has dropped.

Figure 2.9: COD of UK SMEs



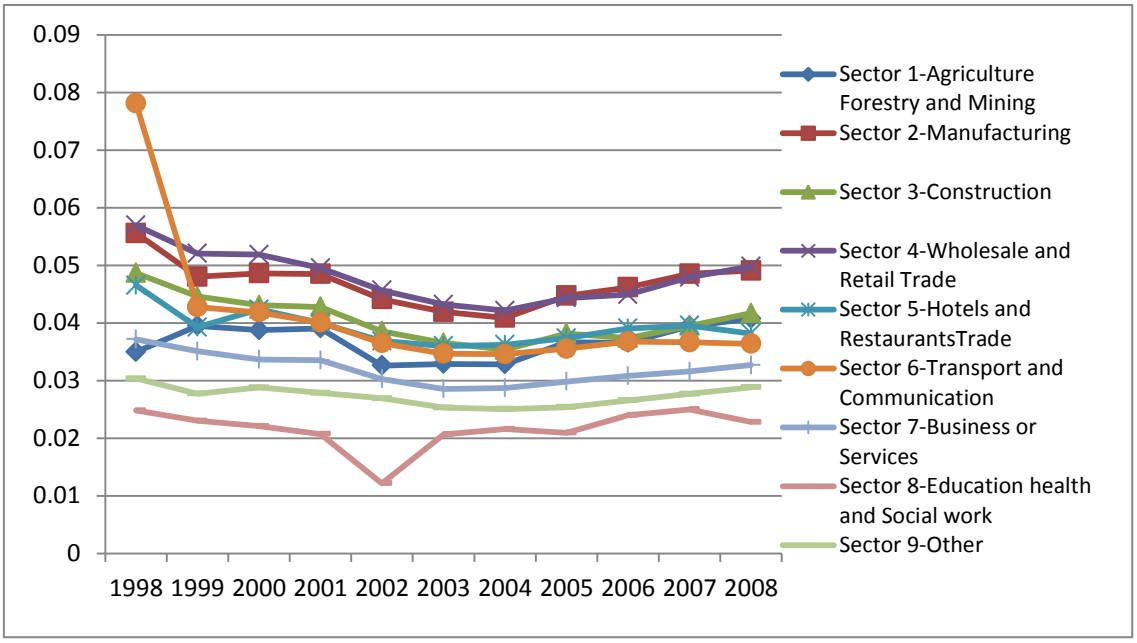
The figure shows the COD of UK SMEs. Data collected from FAME database for the period of 1998-2008. COD shows the cost of debt which is measured by interest cost over total debt.

Figure 2.10: COD of UK SMEs of manufacturing and Service sector



The figure shows COD of UK SMEs of Manufacturing and Service sector. Data collected from FAME database for the period of 1998-2008. COD shows the cost of debt which is measured by interest cost over total debt.

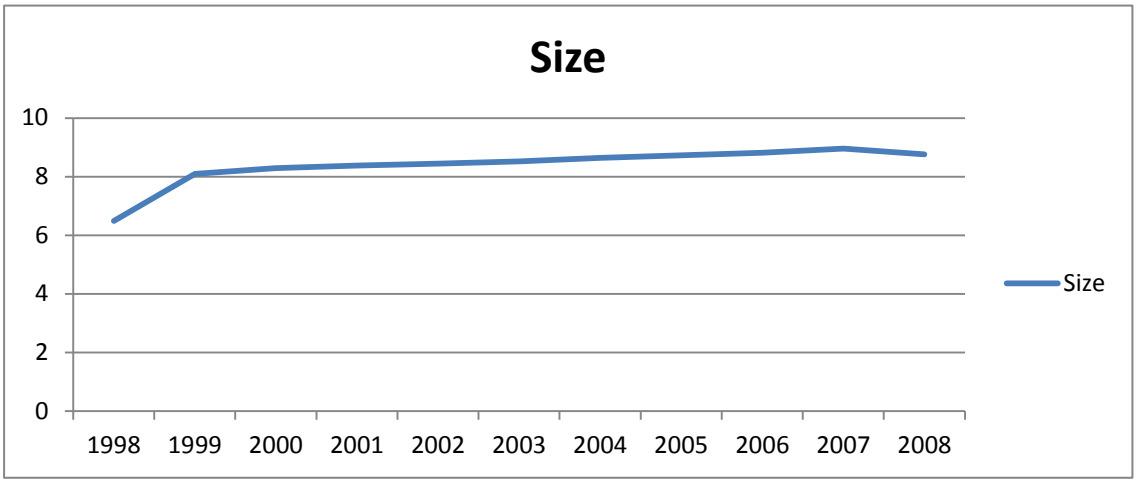
Figure 2.11: COD of UK SMEs of different sector



The figure shows the COD of UK SMEs of different sectors, agriculture forestry and mining, manufacturing,, construction, wholesale and retail, hotels and restaurants transport and communication, business or services education health and social and other. Data collected from FAME database for the period of 1998-2008. COD shows the cost of debt which is measured by interest cost over total debt.

Cost of debt as shown in figure 2.9 has decreased till 2003 and after it has increased. Manufacturing sector report the highest cost of debt and this may be due to the tight credit terms for Manufacturing sector compared to the Service sector[10]. Transport and Communication sector shows a significant drop of the cost of debt capital in 1999 while the Education, Health and Social work sector shows the lowest cost of debt capital among the sectors. The significant drop in 1999 could be due to the change of classification of business activity[11] and may be due to the government decision to increase the spending on Education and Health and charged lower cost of debt in order to encourage the firms in this sector. Average highest cost of debt reports in Wholesale and Retail Trade sector.

Figure 2.12: Size of SMEs in UK

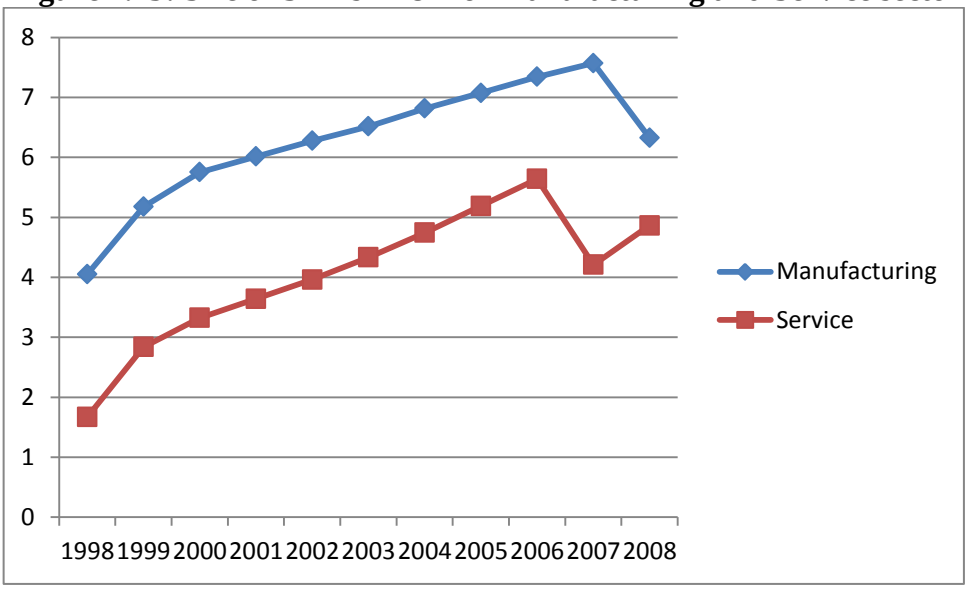


The figure shows the Size of UK SMEs. Data collected from FAME database for the period of 1998-2008 and size is measured by log of total assets.

[10] This is confirmed in the Bank of England 2010 statistics that annual rate of return of Service sector is higher than for Manufacturing sector.

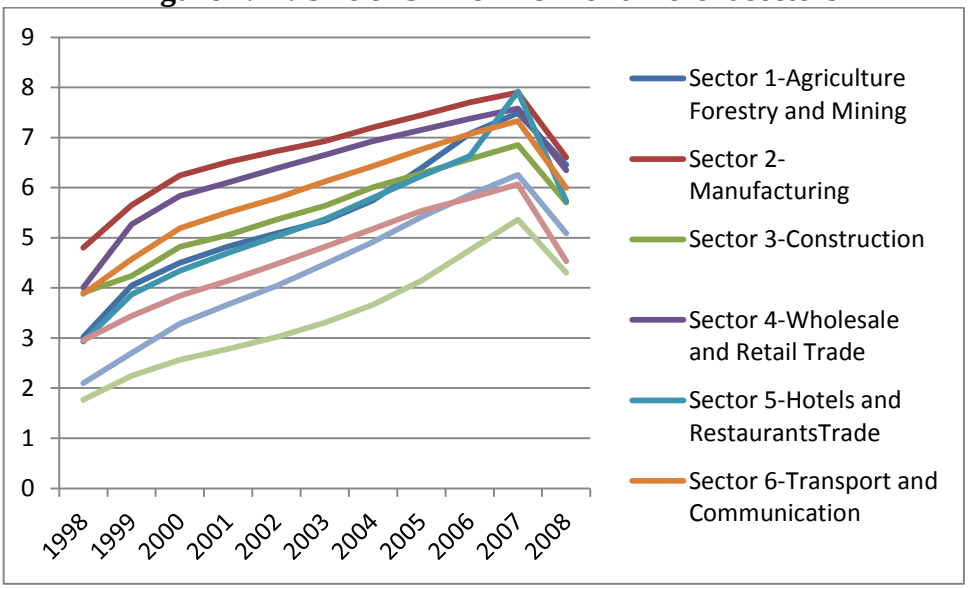
[11] Business Enterprise and Regulatory Reforms (BERR) analysis shows that between 1998-2006 firms switching classification from service to manufacturing providers. If a firm was previously focused on manufacturing but had a small but significant service activity chose to focus solely on manufacturing.

Figure 2.13: Size of SMEs in UK of Manufacturing and Service sector



The figure shows Size of UK SMEs of Manufacturing and Service sector. Data collected from FAME database for the period of 1998-2008 and size is measured as log of total assets.

Figure 2.14: Size of SMEs in UK of different sectors



The figure shows the Size of UK SMEs of different sectors, agriculture forestry and mining, manufacturing,, construction, wholesale and retail, hotels and restaurants transport and communication, business or services education health and social and other. Data collected from FAME database for the period of 1998-2008. Size is measured as log of total assets.

As this study about the SMEs in UK size is very important. Size is measured as log of total assets. As mentioned earlier size of the SMEs in UK during the period shows continuous

increase[12] till 2007 and decline afterwards following the economic crisis. Figure 2.13 shows that service sector has increased its total assets in 2008 started to pick up again after experiencing decline during the crisis while manufacturing sector total assets declining. The graph 2.14 also indicates that same behavior for sectors in 2008 showing that manufacturing sector of SMEs in the UK appeared to have been more important throughout the study period reporting highest total assets.

In general above description suggest that firms have continuously increased the debt capital during the period shows that firms have accepted the risk during the crisis period. But there is not much increase (3.25%) in the level of leverage. As the risk is high during a recessionary period usually financial institutions obtain higher security and increase interest rates rather than allowing the firms to continue to trade. Therefore the increase of debt capital would be due to the private loans (Family, friend etc)[13]. However, the profitability and size has increased throughout the period and significantly decreased in 2008 and cost of debt has increased following the recession.

2.8 Summary and Conclusions.

Focus of this chapter is to discuss the different definitions of SMEs, SMEs in the UK and the preliminary data analysis. First we have discussed why we use the EU definition for SME in

[12] The first year of the study period which is the year 1998, shows very low value compared to the other years. This may be due to the drop of investment, employment and higher cost and low profitability during the period. Business in Britain, A survey of business and trends (2011) shows that there is a decline of overall business confidence in 1998.

[13] When small firms are concerned lenders become more risk averse, even if official interest fall, small find it is very hard and more expensive than previous years to borrow. (British Chambers of Commerce, 2009)

this study. Then we have graphically presented the data for the period 1998-2008 and try to identify whether there is any specific financing pattern throughout the period of study and the financing behavior of different sectors. Preliminary analysis has suggested that leverage ratio has shown a relatively shaky movement in response to the economic condition during the period. Profitability has fluctuated during the sample period and graph clearly shows the immediate response to the economic crisis in 2007-2008. Except the year 2008 size has shown an increasing trend during the period and COD has decreased till 2003 and shows an increasing trend afterwards. These initial data analysis has shown that SMEs in the UK to follow specific financing patterns. In the following chapters we will consider these issues on a deeper empirical investigation.

CHAPTER 3

FINANCIAL POLICY AND CAPITAL STRCUTURE CHOICE OF SMEs IN THE UK

3.1 Introduction

A principle issue in corporate finance is how firms adjust their capital structure to finance their operations. That is the decision related to the existence of an optimal total borrowing ratio. Such a choice like investment financing and dividend policy decisions should be evaluated in terms of its impact on the firms main goal which is to maximize shareholders wealth or in other words, maximize the value of the firm.

With the pioneering work of Modigliani and Miller (1958) debt irrelevance proposition, financial economists have advocated a number of leverage relevance theories[14] to explain the variation in debt ratios across firms. One set of theories suggested is the existence of taxes and bankruptcy costs makes debt relevant (DeAnegelo and Masulis, 1980). Myers (1984) and Ross (1977) suggested the relevance is due to information asymmetry. Myers (1984) and Myers and Majluf (1984) argue that it exists a hierarchy in the financing funds of companies. Due to informational asymmetries, firms will prefer internal to external capital sources. This suggests that high profitable companies will tend to finance investments with retained earnings rather than using debt. If we consider the existence of informational asymmetries between investors and managers, two additional capital structure theories appear the Signalling Theory and the Pecking Order Theory.

[14] These theories are explained in Chapter 2 in detail.

The pecking order theory is especially appropriate for small and medium sized firms. These firms do not typically aim at a target debt ratio; instead, their financing decisions follow a hierarchy, with a preference for internal over external finance, and for debt over equity. Thus, according to the pecking order theory, many SMEs would tend to borrow more and more in case their investment needs are typically well in excess of internally generated cash flows. Changes in debt ratios are therefore driven by their need to obtain external funds rather than an attempt to achieve an optimal capital structure. For example, Ang (1991), Holmes and Kent (1991), and Watson and Wilson (2002), emphasized that the pecking order theory can be easily applied to SMEs. Clearly SMEs have important adverse selection problems that are explained by credit rationing and therefore bear high information costs (Psillaki 1995). These costs can be considered nil for internal funds but are very high when issuing new capital, whereas debt lies in an intermediate position. Moreover, SMEs are often managed by very few managers whose main objective is to minimize the intrusion in their business and avoid the discipline inherent in financing options other than internal funds. That is why internal funds will lie in the first place of their preference of financing. In case internal funds are not enough, SMEs will prefer debt to new equity mainly because debt means lower levels of intrusion and, most importantly, lower risk of losing control and decision-making power than new equity.

The Signalling theory is of little use for the small firm sector as SMEs are not usually listed in stock exchange markets and therefore their managers do not intend to signal something to the market and investors while adopting their financing decisions. On the contrary, the latter

theory could be very useful for our purposes.The other relevant theory is agency theory[15] advanced by Jensen and Meckling (1976) which was derived from the conflict between corporate managers, outside stock holders and bond holders. The general result from the various capital structure studies is that the combination of leverage related costs and tax advantage of debt, produces an optimal capital structure below 100% debt financing, as the tax advantage is used to trade against the likelihood of incurring bankruptcy costs. Given all those theoretical issues question that arises whether or not various gearing related costs and benefits are economically enough to have an appreciable impact on optimal capital structure.

Although these theoretical approaches deal with capital structure from different perspectives, what they have in common is that they all study large firms[16] as opposed to small and medium sized enterprises (Michaelas et.al, 1999 and Lopez and Aybar (2000). Capital structure decisions are dynamic by nature and should be modeled as such in empirical analysis. Many earlier studies on the determinants of capital structure decisions have tended to limit themselves to static modeling. This study extends the empirical research on the topic of capital structure by focusing on the dynamics of capital structure decisions. It would be ideal to provide more insight into the long run capital structure determinants of target capital structure of firms using a sample of Small and Medium sized Enterprises (SMEs). It also estimates the dynamic capital structure model using a much stronger estimation technique. In

[15] Agency theory investigates the conflicts of interests between the stakeholders of the firm. Basically, agency theory considers the conflicts of interest between shareholders and creditors, and between shareholders and managers. SMEs are not possibly to suffer from this second issue as their property identifies almost exactly with their management and thereby there will only be a unique financial objective for these two groups. Notwithstanding, the agency conflict between shareholders and lenders may be particularly severe for SME (see Ang et al,1992).

[16] For example Bradley et al. (1984), Auberbach (1985), Friend and Hasbrouck (1988), Titman and Wessels (1988), Barclay and Smith. (1995), Rajan and Zingales (1995), Graham (1996), Shyam – Sunder and Myers (1999), Wald (1999), Wiwattanakantang (1999), Hovakimian et al. (2001), Fama and French(2005) and Ariff et al(2008).

doing so, our use of dynamic adjustment model (Ozkan, 2001) enables us first to test the dynamic adjustment proposition and then to identify the both firm specific and macroeconomic factors driving the capital structure changes.

The rest of the chapter is organized as follows. Section 3.2 outlines the previous research on capital structure of SMEs and provide the details on firm specific, macroeconomic variables and adjustment to financial targets. Section 3.3 explains Firm specific and macroeconomic variables that influence capital structure. Section 3.4 explains the model in detail, panel data, fixed effect regression and Generalized Method of Moment (GMM). Section 3.5 explain the empirical model 3.6 Data and sample 3.7 Definitions of variables, 3.8 results and discussion and finally conclusion and recommendations for further studies.

3.2 Review of the previous studies

Review of the previous studies consists of two subsections where section 3.2.1 reviews the previous studies relating to large firms of other countries and UK and small firms of other countries. Section 3.2.2 reviews the literature relating to SMEs in the UK.

3.2.1 Empirical studies on Large and other country Small firms

It is obvious from the large amount of literature on this topic that there is no consensus on what constitutes optimal capital structure in application, although there is strong evidence from many studies that firm specific factors are correlated with capital structure. Much of the previous studies on determinants of borrowing decisions of firms have concentrated on the factors predicted by the static trade off theory of capital structure which is based on a tradeoff between the tax advantage of debt financing and the costs of debt financing and cost of financial distress. Myers (1984), argued the static trade off theory implies that the actual debt

ratio reverts towards a target or optimum, and it predicts a cross sectional relation between debt ratio and assets risk, size, profitability, tax status and assets type. The results of the empirical studies on SMEs in the UK (Micheales et al, 1999) confirm some of these predictions in that firms in the same industry, facing similar leverage ratios.

Moreover, the evidence of these studies supports the negative impact of business risk on corporate borrowing decisions. In the context of small business sector, Queen and Roll (1987) argue that SMEs are likely to have a higher level of operating risk relative to the large firms. According to the theory of financial distress, higher operation risk increases the probability of financial distress, so firms have to trade off between tax benefits and bankruptcy costs.

However there are conflicting conclusions on the impact of other firm specific variables. For instance, Bowen et al (1982) Kim and Sorensen (1986) Michealas et al(1999) and Ozkan (2001) provide evidence on the negative relationship between non-debt tax shields and leverage. Conversely Bradely et al(1984), Titman and Wessels(1988) and Homaifar et al(1994) fail to provide such a support. There are also conflicting results on the relationship between size and leverage. Ferri and Jones (1979) Kim and Sorensen (1986), and Chung (1993) show that there is no systematic association between firm size and capital structure. Homaifar et al (1994), Titman Wessels (1988) and Michealas et al (1998) report that larger firms have higher debt ratio. There is also strong empirical evidence for the view that there is a negative relation between profitability and debt ratio. This is again consistent with the pecking order theory of capital structure. For instance the findings of Titman Wessels (1988), Rajan and Zingales (1995) Michealas et al(1998) and Ozkan (2001) give strong evidence for

this negative relationship. However, Long and Malitz (1986) do not find such a relation between leverage and profitability.

In the literature there are other studies which focus on the determinants of capital structure and the adjustment to financial targets. There are studies (Taggart ,1977; Shyam-Sunder and Myers,1999; Ozkan,2001 and Ariff, 2008) in the literature that provide more direct evidence that firms adjust towards a target debt ratio. These studies also provide some information on the likely determinants of speeds of adjustment toward target debt ratio. Taggart (1977) gives evidence that the speed of adjustment to the long-term capital targets are relatively slow and liquid assets and short-term debt play an important role in the adjustment process. He obtains quarterly data for the period of 1957-1972 and implies that when a firms' debt to equity ratio is below target, they issue more debt and less stock. Further he finds that adjustment is slow as the adjustment coefficients are very small and the timing considerations have an important influence on corporate financing decisions. He explains change in permanent capita is influenced by the firms target debt equity mix, interest rate timing conditions and retained earnings. Taggart (1977) proposes that interest rate timing conditions are important as they affect the financing decision of firms and if the firm expect decline of long run interest it may postpone raising long run funds and borrow short term until the interest rate fall.

Using a sample of 748 UK quoted companies over the period 1959-1970 Marsh (1982) applying logit model analyses the choice of financing instrument of companies and argue that this choice depends on the difference between the companies current and target debt ratios. The results suggest that companies try to maintain their long-term target debt levels, even though they deviate from this target in the short run in response to capital market conditions.

He finds that the companies' choice between debt and equity is not influenced by the finance structure and companies are concerned about the market history and the security prices in choosing debt and equity mix. For both short-term and long-term debt companies do not have target level in mind. In addition to that this paper also provide evidence that long-term target debt levels are influenced by operating risk, size and the assets composition.

Jalilvand and Harris (1984) look at the determinants of speed of adjustment to long-term financial target where the speed of adjustment is allowed to vary across companies and over time. In particular, using US corporations this study assumes perfect capital markets and study whether there is a relationship between financing decision and firm value. Assuming investment decisions are exogenous Jalilvand and Harris (1984) examined the process of parcial adjustment, allowing speed of adjustment to vary by firm size and capital market conditions. They suggest that the firm size, interest rates and stock price levels affect the speed of adjustment. They explain that firms financing decision is based on the cost of capital it has. Following Marsh (1982) and Taggart (1977) they specified the targets based on the book value rather than market value as the market value fluctuate a lot.

Jalilvand and Harris (1984) concluded that management expectations about interest rates and stock prices and firm size affect the adjustment speed. Deriving a model that firm value have a target ratio for all financial variables Jalilvand and Harris (1984) noted that speed of adjustment can be different among different firms over time. They also find that long-term debt, short-term debt and liquid assets are the main sources of the firms financing needs and the firm will adjust more quickly to its target level of long term debt and more slowly the equity target.

Rajan and Zingles (1995) compared the capital structure of Canada, France, German, Italy, UK with US and investigate that the same factors influence the capital structure of other countries as US. This study finds that size, profitability, market to book ratio and tangible assets are the major factors that determine the capital structure of these countries and the firms with higher collateral are not highly levered. Further they find that profitability and market to book ratio are negatively related to leverage. This study does not provide any evidence supporting to the relationship between size and leverage but firms with high market to book ratio appeared to be negatively related with profitability.

Berger and Udell (1998) study a sample of US small finance data from 1993 and show the source of small business finance and how capital structure varies with the firm size and age. Further they find that smaller firms tend to use more internal finance (internal funds and loans from stockholders) and more debt finance and external equity use rarely compared to the larger firms. They explain this is mainly due to the information asymmetry as small firms are not required by law to disclose information of their financial statements and this influence the source of finance of small firms.

Shyam-Sunder and Myers (1999) test a benchmark target adjustment model against a pecking order model and report that the target adjustment model appears to be superior. Using 157 US firms during the period of 1971-1989 they present an equation for pecking order model. The intuition behind their model is that financial deficit[17] of the firm should mainly be met by debt

[17] See page 224 of Shyam-Sunder and Myers, 1999 for more definition of financial deficit.

capital. Even though there results are statistically not significant they explain that the pecking order theory better explain the time series variance in actual debt ratio than a target adjustment model which is based on trade off theory.

There is only a limited amount of empirical work done on the capital structure decisions of the SMEs in the UK. The exception is Michealas et al.(1998). Bennett and Donnelly (1993), Lasfer (1995), Walsh and Ryan (1997) and Ozkan(2001) study based on the large firms.

Bennett and Donnelly (1993) study attempts to explain the cross-sectional variation in the capital structures of non-financial UK companies using proxy variables for characteristics suggested by capital structure theories. Using date on listed UK firms from 1977-1988 Bennett and Donnelly (1993) find that long-term debt is more representative of a firms capital structure policy.

Bennett and Donnelly (1993) find that non-debt tax shields, asset structure, size and past profitability exert an important impact on the capital structure choice of firms as suggested by the theory. In this study they attempt to explain the cross-sectional variation in the capital structures of non-financial UK companies using proxy variables for characteristics suggested by capital structure theories. Earnings volatility is found to be positively related to leverage. This finding, though counter intuitive, is consistent with the hypothesis of Myers (1977) that risky firms may borrow more than safer ones. In addition, they find evidence that capital structures vary across industrial classification.

Lasfer (1995) examines the impact of corporate tax and agency cost on firms capital structure decisions using a sample of 88 industrial and commercial UK (non-financial) companies over period 1972-1983. This study uses both the cross sectional and time series variation in the capital structure of firms and provides evidence consistent with agency theory, that firms with fewer growth opportunities have more debt in their capital structure. This study also finds that firms that are more likely to have free cash flow have low debt impact on the capital structure choice of firms in the short run. Lasfer (1995) suggest that agency cost is the major determinant of capital structure. Moreover they find that in the long run tax exhausted companies exhibit significantly lower debt ratio than tax-paying firms and taxation do not affect the short run capital structure decisions.

Walsh and Ryan (1997) test a binomial choice model based upon observed debt and equity. Using a date set from of British public limited companies for the period of 1984-1991 the study the impact of tax and agency consideration on the capital structure decisions, mainly the issue of debt and equity. They find that agency and tax considerations are significant in determining debt and equity decisions of the UK firms. Consistent with Lasfer (1995) they explain that agency considerations are more influencing in determining the choice of debt and equity issue rather than tax considerations.

Based on Australian family and private businesses Romano et al (2000) demonstrates that size, industry, age of the firm, age of CEO, extent of family control, business planning, owners business objectives, and plan to achieve growth influence family business owners financing decision. Moreover, their model has established that family businesses drive their funding from a number of even multiple sources and the decision regarding type of finance is

based on a complex array of social, behavioral and financial factors. Service industry family businesses are less likely to use family loans as they plan to achieve growth through new products or process development.

Ozkan (2001) study the empirical determinants of the target capital structure of the firm and adjustment process towards this target. This study suggests that a firm adjusts its capital structure dynamically against its own target capital structure. It is further suggested that this adjustment process changes over time at different speed of adjustment.

Ozkan(2001) has provided the following insight to the empirical determinants of corporate borrowing. The evidence suggest that firms have long-term target leverage ratio and they adjust to the target ratio relatively fast, implying that the cost of being away from their target ratios and the cost of adjustment are equally important for firms. The results also provide evidence that profitability, liquidity, growth opportunities, non-debt tax shields and borrowing ratio of firms exist an inverse relationship.

Using a sample of Spanish firms during the 5 year period from 1994-1998 by Sogorb-Mira and Gracia (2004) test both trade off and pecking order theory and explain the main factors that determine the financial policy of SMEs. Using GMM[18] and 2SLS[19] test the Trade off theory and Pecking order theory. The results suggest that both theoretical approaches contribute to explain the capital structure of SMEs in Spain. They find that age plays an

[18] Arelano and Bond, 1991

[19] Anderson and Hsiao, 1982

important role in financing decision of Spanish SMEs and older firms use less debt and younger firms more often depend on debt. Consistent with the findings of Sogorb-Mira and Gracia (2004) using a panel data technique Degryse et. al (2009) show that predictions made by the pecking order theory is in line with the capital structure of Dutch SMEs. They investigate the capital structure of SME from 2003-2005 using LSDV estimator they document that SMEs use profit to reduce their debt level and growing firms increase their debt position since they need more funds which implies that when internal funds are depleted long term debt is the next in the pecking order. In addition, consistent with the maturity matching principle long term assets are financed by long term debt, while short term assets are financed by short term debt and larger firm have relatively more long term debt than short term debt which implies that the maturity is the way to mitigate the risk. In line with Michealas et al (1999) this study also found the inter-industry effect of capital structure and linked them closer to the importance of pecking order theory and trade-off theory and conclude that firm characteristics are more important than industry characteristics in explaining capital structure of Dutch SMEs.

Using the conditional quantile regression method of distribution Fattouh, Harris and Scaramozzino (2008) demonstrate new insights in to the choice of leverage ratio. They use the UK firm observations for the period 1988-1998. They estimate the coefficients at 7 quantiles and find that firms that experience an increase in internal funds demand less for debt. This is consistent with the Pecking order theory and suggests that an increase in internal funds is related to a decrease in leverage and especially so for highly leveraged firms. They have shown that explanatory variables on leverage are different at different quantiles of the

distribution. Results reveal that effect of firm size on leverage is positive at lower quantiles and it is negative at upper quantiles.

Ariff et al (2008) investigate the capital structure determinants and the speed of adjustment to target debt ratio by firms under distress and firms not under distress. In modelling using dynamic capital structure model, both firm specific and macroeconomic variables were used as the inclusion of financially distressed firm sample necessitated the use of macroeconomic variables. They use listed firm data of Malaysia over the period 1986-2001. The findings are similar to the studies in developed countries and consistent with the capital structure theories such as pecking order theory. Consistent with Ozkan (2001) they found that speed of adjustment is relatively fast and firms have target leverage ratio.

In the above literature review we discussed the capital structure decisions of quoted and unquoted companies and it is clear that most firms are likely to suffer from information asymmetry. Most of the empirical work study the determinants of capital structure of large firms and tend to concentrate on the factors predicted by Myers (1984) the static trade off theory suggests that the actual debt ratio reverts towards target. Further this predicts the relationship between debt ratio and other determinants such as size, asset risk, profitability, and growth. It is evident from the vast amount of literature on this topic that firm specific factors are correlated with capital structure irrespective of the size (Large or small) of the firm. Study based on UK by Ozkan (2001) suggest that firms adjust their capital structure dynamically and this change over time at a different speed of adjustment. Unlike in the previous studies based on UK, SMEs we focus on both firm specific and macroeconomic variables and by applying theoretical and empirical model of capital structure determinants

and also using dynamic model which made possible to provide additional insight in to the capital structure determinants.

3.2.1 Empirical evidence on SMEs in the UK

Hughes (1997) examine the balance sheet structure, gearing and profitability of non-financial data from UK companies for the period of 1987-1989 dividing the sample in to two as large and small companies. Due to the signaling problems associated with the equity issuing equity funding is more problematic for small firms and retained earnings and bank finance and also famous among small firms. He finds that small firms have low fixed to total assets ratio and more current liabilities. He further explains that manufacturing firms are more geared than non-manufacturing firms. Further this study concluded that the evidence for general equity or debt gaps in the UK is weak. It is considered to promote the seedcorn funding of SME co-operative or mutual guarantee schemes to reduce the information asymmetry in UK credit market.

The relationship between capital structure and strategy is explored by Jordan et al (1998) in the context of SMEs in the UK. The sample was extracted from 10 or less years old SMEs in the South East of England for the period of 1989-1993. In this study they have defined the SMEs as firms with less than 100 employees and less than £10 million turnover. This study use questionnaire method for data collection. The results of this research support the idea that there are certain financial variables play an important role in determining the capital structure of SMEs in the UK and support the aspects of a strategy-capital structure relationship which indicates that both strategic and financial factors are necessary to explain the chosen debt level. Further this study supports the notion that small firms adopt pecking order approach when funding their activities and variability in profits results in distress borrowing. It has

been argued that owners of small firms are reluctant to give up the control and willing to finance expansion through internal funds, debt and equity respectively. However this is not consistent with Frank and Goyal (2003) where their sample provides more supports for the pecking order theory of large firms than small firms.

Using 3500 UK small firms which satisfy the SME definition for 10 years from 1986-1995 covering all ten industries in the UK Michealas et al(1999) find that most of the determinants of capital structure presented by the theory of finance appear indeed to be relevant to the UK small business sector. The results of this study analyse using Least Square Dummy Variable (LSDV) model. Size, age, profitability, growth opportunities, operating risk, asset structure, stock turnover and net debtors all seem to have an effect on the level of both short and long-term debt in small firms. Furthermore this study provides evidence which suggest that the capital structure of small firms is time and industry dependent.

Michealas et al(1999) show that most of the capital structure theories appear to be relevant for the SMEs in the UK and average short term debt ratios of SMEs in the UK appears to be increasing during the period of economic recession and decrease in the market place economic condition improves. Average long term debt ratio shows a positive relationship with the change in economic growth. The main conclusion of this study is that agency and asymmetric information cost have an effect on the level of both short and long term debt of small firms. They claim that since the cost of external equity may be higher for small firms than for large firms due to transaction cost, adverse selection and control considerations pecking order theory approach is particularly relevant for small firms.

Panno (2003) finds that, for a sample of security issues by UK quoted companies 1992–1996, firms' leverage is related to size, profitability, liquidity and the tax shield. This study investigate the capital structure choice of UK and Italian companies separately as these two countries have different financial systems he check how the market-based economy and bank-based financial market determine the capital structure choice. A descriptive model of choice is developed and estimated using Logit and Probit estimation procedure. The results show interesting difference between two financial markets and support the idea that UK market is more consistent with the recent development of capital structure principles. Further results show that size and profitability is positive and negative impact of liquidity and bankruptcy risk on financial leverage of companies. The negative effect displayed by the available reserves which are taken as a proxy of internally generated funds is consistent with the pecking order theory. Unlike in the UK optimal debt level does not seem to be a major concern in Italy. In both markets tax advantage of debt is important in determining capital structure decision.

In summary, these studies provide evidence suggesting that the capital structure of SMEs in UK is also affected by the similar factors to those in large firms and SMEs in other countries. However, they differ from the type of the debt use in the capital structure. These studies suggest that market for long run debt is not effectively functioning in small firms and small firms heavily depends on short term debt to avoid this problem. The common approach that has been used in the previous studies of capital structure is the static trade off model. In order to address the shortcomings of the static trade off model and as this model is unable to correctly describe the firms financing behaviour we use dynamic capital structure model.

3.3 Dependent variable, Firm specific and macroeconomic variables that influence capital structure

Determination of leverage in the SME theoretical framework does not substantially differ from theory of capital structure of large listed firms, though there are some specific characteristics that should be noted. Theory of capital structure dates back to the "capital structure irrelevance" proposition of Modigliani and Miller (1958) in relation to the value of firms operating in perfect markets. Following literature placed much emphasis on relaxing the assumptions made by Modigliani and Miller, in particular considering agency costs (Jenson and Meckling (1976); Myers 1977; Harris and Raviv (1990), asymmetric information (Myers and Majluf 1984) signalling (Ross 1977). According to Myers (2001) though current state in studies of capital structure comprises a wide variety of theoretical approaches but no theory is universally accepted and practically applied. According to the same author "there is no universal theory of debt equity choice, and no reason to expect one. There are several useful conditional theories however." Optimal capital structure theories depend on which economic aspect and firm characteristic the study focus on. The trade-off theory focuses on taxes, the free cash flow theory emphasis on agency cost and the pecking order theory focuses on differences in information. Different theories based on taxes, agency cost and information are relevant for financing choice. Asset (size) profitability and risk are the key determinants explained in trade-off theory and growth opportunities link to the pecking order theory. This study will attempt to apply the theories of capital structure in the small business sector and develop hypothesis that examine the determinants of capital structure in UK SMEs.

Following the previous studies[20] the determinants of capital structure we use the same set of firm specific variables as the determinants of leverage. All the firm specific variables we have used in this study are computed using the book value. As there is a large variation of the size of the firm we have deflated the variables using the total assets. Table 3.1 shows the explanatory variables and their expected relationship to debt ratio.

Table 3.1
The Explanatory Variables and Their Expected Relationship to Debt Ratio

Variable	Authors	Expected sign	Rational
Size	Titman and Wessels 1988 Rajan and Zingles(1995)	+	Small firm demand less debt due to low marginal corporate tax rate, higher bankruptcy cost and greater cost of informational asymmetry.
Profitability	Chittenden et al.,1996a, Titman and Wessels 1988	Ambiguous	Highly profitable firms should have a lower debt ratio
Net Debtors	Michaelas et al 1999	+	Long term loans represent smaller percentage of small firms.
Operating risk	Titman and Wessels 1988 Michaelas et al 1999	_	High risk companies have lower borrowing
Future Growth Opportunities	Long and Malitz,1988	+	Future growth opportunities encourage firm to employ more debt capital.
Non-Debt Tax Shields	Bradley et al., 1984	_	Literature indicates that firms that have high NDTS are likely to use less debt.
Collateral Assets	Michaelas et al(1999) Degryse et al (2009)	+	Collateral assets decrease the problem of information asymmetry and reduce the risk of lending.
GDP Growth	Booth et al. 2001	+	During a period of economic growth firms employ more debt capital to finance their expansion programs.
Inflation Rate	Korajczyk and Levy,2003	+	During an inflationary period firms utilize more debt in capital structure as the real cost of debt falls.

[20] Bradley et al., 1984, Titman and Wessels(1988), Harris and Raviv (1991), Rajan and Zingles(1995), Chittenden et al.(1996a), Michealas et al (1999) and Booth et al(2001).

3.3.1 Dependent Variable

In this study capital structure is the dependent variable and normally define by Total Debt to Total Assets (TDA). This variable is computed using the book value. Even though theory prefers market based measurement (MM 1958) shows that leverage does not affect the market value of the firm. Rajan and Zingles(1995) state that any capital structure theory has not specified which leverage measurement should be used. However many researchers (Michealas et al ,1999; Ozkan, 2001) use the same measure for leverage.

3.3.2 Firm specific and macroeconomic variables that influence capital structure

3.3.2.1 Age and Size

Petersen and Rajan (1994) show that leverage decreases with age, but increase with size. It is also argued that larger firms[21] are more diversified (Titman and Wessels, 1988), have easier access to the capital markets, and borrow at more favourable interest rates. Hence, Rajan and Zingles (1995) suggest that as large firms are less subject to information asymmetry they are more capable of obtaining equity capital and therefore lower the debt capital which means that there would be a negative relationship between leverage and size. The tradeoff theory suggest that the optimal capital structure for any particular firm will reflect the balance between the tax shield benefit of debt and the increasing agency and financial distress costs associated with high debt levels.(Jensen and Meckling 1976; Harris and Raviv 1990). Titman and Wessels (1988) argue that due to the cost and risk associated with leverage small firms maintain less relationship with financial institutions which make small firms less preferable

[21] Size is considered as a proxy for information asymmetry and larger firms are subject to more news than small firms as the investment community is more concerned in gathering information of large firms and investigate more closely.

clients and they are charged at high interest rates while large firms are offered competitive interest rates. Confirming this idea Ozkan (2001) further explain that small firms are more sensitive to economic downturns and face high chance of liquidation in situations of financial distress as they have less resources available. As a result small firms use more short term debt than larger firms. From a financial distress perspective as larger firms are more diversified they are expected to go bankrupt less often than smaller ones (Pettit and Singer (1985), so size must be positively related to leverage. Following Rajan and Zingles(1995) and Michealas et al. (1999) we use natural logarithm of total assets and total sales as a proxy for the size of the firm.

3.3.2.2 Profitability

The Pecking order theory suggest that firms will use retained earnings first as investment funds, and subsequently move to debt and new equity only if necessary (Myers,1984). As retained earnings have no adverse selection problem and firm would not suffer from the information asymmetry that they face when they try to access the external sources of finance. Therefore, retained earnings is the cheapest source of finance. Consistent with the Shyam-Sunder and Myers (1999), Bennett and Donnelly (1993), Michaelas et al (1999) and Ozkan (2001) find that there is a negative relationship between leverage and profitability in UK large as well as small firms. In this case there would be a negative relation between profitability and gearing.

There are contradictory views on the relationship between leverage and profitability. MM (1963) argues that firms prefer more debt in order to get the tax advantage. Therefore, profitable firms employ more debt as increase of leverage increase the tax shield.

Furthermore, highly profitable firms are encouraged to have higher level of debt through less agency and bankruptcy cost because of their increased ability to meet the debt repayment obligations and less likely to be subject to the bankruptcy risk. In a trade-off theory framework an opposite conclusion is expected. Firms normally have to pay taxes on their profits. In order to avoid this firms generally like to have more debt in their capital structure as interest payments are tax deductible. Tax shield benefits of debt will induce profitable firms to use more debt (Jensen and Meckling 1976; Myers 1977; Harris and Raviv 1990). We use the ratio of earnings before interest and tax to the total assets as the measure of profitability following Rajan and Zingles (1995) Titman and Wessels(1998) and Micheals et al(1999).

3.3.2.3 Future Growth Opportunities

Myer (1977) argued that high growth firms might have more options for future investment than low growth firms. For growing firms internal funds may not be sufficient to finance their investment opportunities and, hence they like external funds. Following the pecking order theory if external funds are required firms prefer debt in order to minimize the information cost. Therefore the relationship between growth opportunities and leverage is positive. The agency problem suggests that negative relationship between capital structure and firm's growth. Thus highly leveraged firms are more likely to pass up profitable investment opportunities, because such an investment will effectively transfer wealth from the firm's owner to its debt holders. Furthermore, growing firms have more flexibility in choosing their future investment therefore agency costs are higher (Titman and Wessels, 1998). As a result, firms with high growth opportunities may not issue debt in the first place, and leverage is expected to be negatively related to future growth opportunities. Following Micheals et. al

(1999) we use intangible assets to total assets as a proxy for growth opportunities we test the conflicting predictions.

3.3.2.4 Operating Risk

Due to the agency and bankruptcy costs a firm's optimal level of gearing is a decreasing function of the volatility of earnings as a measure of operating risk (Titman and Wessels;1988). Queen and Roll (1987) argue that SMEs are likely to have a higher level of operating risk relative to the large firms. According to the theory of financial distress, higher operation risk increases the probability of financial distress, so firms have to trade off between tax benefits and bankruptcy costs. Due to the higher risk of the earning volatility which means that dropping of earning below the debt service commitments increase the financial distress. To avoid this risk firms have to reduce their debt level as predicted in trade off theory. According to Myers (1977) firms with high earning volatility accumulate cash in good years and avoid under investment problems in the future following the pecking order theory. Therefore operating risk will be negatively related to debt ratio. Following Titman and Wessels (1988) we also use standard deviation of profitability to total assets as the measure of operating risk.

3.3.2.5 Tangibility

Both theory of financial distress and agency theory propound that tangibility has a positive relation to capital structure. According to the theory of financial distress, if a firm has a high proportion of tangible assets, it will use more debt than a firm with high proportion of intangible assets, because the former has lower costs of financial distress in the case of bankruptcy. In the UK, it is common for lenders to require collateral or to offer loans only if they are secured (Blinks et al.1997) It would therefore be expected that firms which possess

fixed assets with a high collateral value will have easier access to external finance and probably a higher level of debt in their capital structure relative to firms with lower levels of collaterable assets. Because the risk of lending to a firm with more tangible assets is expected to be low and lenders will demand low risk premium hence it decrease the problem of asset substitution. Rajan and Zingles (1995) confirm the same that use of tangible assets as collateral increase the liquidation value of the assets in the event of financial distress. Collateralising of assets make borrowers to use funds for the specified projects which reduce the agency cost as well as cost of debt. According to the tradeoff theory there is a positive relationship between tangibility and leverage. Further Myers and Majluf (1984) suggest that issuing debt is cheaper compared to issuing shares as firms with more collaterable assets is in a good position to issue debt at an attractive rate which result again a positive relationship between tangibility and leverage. Michaelas et al(1999) and Degryse et al (2009) find positive relationship between debt ratio and collateral for small firms. To test this prediction for SMEs in the UK we use tangible assets to total assets following Rajan and Zingales (1995).

3.3.2.6 Net Debtors

This is particularly an important area for SMEs as they put less effort on collecting payments from customers. Chittenden and Bragg (1997), argue that as shareholders interest and long-term loans are a smaller percentage of a small firms' liabilities, there appear to be less scope for accommodating late payment of receivables by increasing equity or long term debt. Therefore the two main avenues open to small firms suffering from late payments, are to increase short term bank borrowings or delay payments to creditors. The way of offsetting late payments is trade credit. However, it has also been shown by Chittenden and Bragg (1997), that delaying payments to creditors cannot be taken beyond a certain point; we can therefore

expect small firms to increase short term bank borrowing when suffering from late payments. In the pecking order theory creditors comes first and short term debt next. Therefore we expect a positive relationship between net debtors and leverage. Following Michelas et al. (1999) net debtors which is measured by debtors minus creditors to total assets shows the relationship between liquidity and leverage.

3.3.2.7 Non –Debt Tax Shield

MM (1963) show that firms which pays corporate tax will increase their leverage in order to get the benefit of tax shield. Trade off theory explains the same that tax shield is the main advantage of the using debt capital. Tax based theories argue that tax and bankruptcy considerations are a primary force influencing capital structure decisions. According to these theories, taxpaying firms would be expected to substitute debt for equity, at least up to the point where the probability, of financial distress starts to be important. In practice firms do not follow this policy. Ray and Hutchinson (1983) show that many small firms do not use any debt. As discussed by McConnell and Pettit (1984) and Pettit and Singer (1985) smaller firms are expected to be less profitable and to have less use for tax shields than large firms. Furthermore they show that smaller organizations derive less benefit from the tax shelter of deductible corporate interest. Higher bankruptcy cost and lower tax benefits would work in the direction of reducing corporate small business debt below that adopted by otherwise equitant to large firms. Therefore existence of non-debt tax shield make leverage more expensive and marginal tax saving decrease as the probability of bankruptcy increase with the leverage (DeAngelo and Masulis, 1980) So the tax rate will be positively related to gearing and Non-debt tax shields will be negatively related to leverage.

3.3.2.8 Macroeconomic Variables

Rajan and Zingales (1995) stated that macroeconomic factors alter the impact of firm specific variables on capital structure. In addition to that changing macroeconomic conditions influence the agency problems and therefore ultimately the adaptability of firms for different macroeconomic conditions would result in changing the capital structure of the firm.

Korajczyk and Levy (2003) found that macroeconomic conditions vary over time and the capital structure decision also varies over time and across firms. The response of firms to the macroeconomic conditions will change the firm value. Therefore managers have to make adjustments to the leverage that maximized the value of the investors. In order to maintain the debt equity level that maximizes the firm value managers should respond to the macroeconomic changes altering the target capital structure and adjustment speed. Cook and Tang (2010)[22] find the adjustment speed of under-leveraged firms in good macroeconomic conditions is slower than the over-leveraged firms which mean that under-leveraged firms are less likely to adjust their leverage ratio towards the target.

We examine the effect of macroeconomic condition on the capital structure of SMEs in the UK and we have selected GDP and inflation. This selection is based on the firms' economic implications for external financing. For instance inflationary condition which might result in adverse effect on the debt holders and increase in the capital expenditure would affect the overall debt market increasing the cost of debt.

[22] Cook and Tang (2010) study the macroeconomic condition and capital structure adjustment speed for sample of US firms and found a positive correlation between adjustment speed and macroeconomic condition and show that macroeconomic conditions have significant effect on target capital structure.

GDP is a broad indicator which describes the difference in wealth in country. Growth in the GDP encourages firms to expand their businesses. In particular, in developing countries firms become more leveraged as stock market develop. Booth et al. (2001) in their cross sectional study, find negative influences of stock market ratio on GDP and inflation rate on total debt ratio and positive influence on GDP growth rate. Growth in GDP is a proxy for investment opportunity set by firms (Smith and Watts, 1992) and this effect the optimal financing choice (Myers, 1977). Therefore GDP growth rate will be positively related to leverage.

In addition to increases in real asset prices, general goods price inflation may also provide an incentive towards high leverage because of the tax deductibility of nominal interest payments. Nominal interest payments can be separated in to two components, one compensating creditors for the decline in the expected real value of their principle and the other for the use of the borrowed funds (the real interest paid). The borrower receives a tax deduction, not only on that component which reflects the real cost of funds but also on that part which represents compensation for reduction in the real value of the principle. The higher the inflation, the greater the tax deduction gained through this second component. It is natural think that firms with more assets and more collateral available face less obstacle in receiving debt and hence, have higher leverage. The expectation of high inflation make credit cheaper today and therefore it is positively related to leverage. In contrast with Frank and Goyal(2004), Korajczyk and Levy(2003) find that the domestic macroeconomic conditions besides inflation, help determine a firm's leverage. They show that financially unconstrained firms take in to account the macroeconomic conditions when issuing debt to equity more than constrained firms where less follows the macroeconomic condition in the country. Therefore

expected inflation is found to be positively related to the debt. Inflation rate will be positively related to debt.

3.4 The Model

3.4.1 Panel data

Panel data, also called longitudinal data or cross-sectional time series data, are data where multiple cases (people, firms, countries etc) were observed at two or more time periods. There are two kinds of information in cross-sectional time-series data: the cross-sectional information reflected in the differences between subjects, and the time-series or within-subject information reflected in the changes within subjects over time. Panel data regression techniques allow taking advantage of these different types of information[23].

3.4.2 Fixed Effects Regression

Fixed effects regression is the model to use when we want to control for omitted variables that differ between cases but are constant over time. It lets us to use the changes in the variables over time to estimate the effects of the independent variables on our dependent variable, and is the main technique used for analysis of panel data. In order to decide which method we should use we applied the Hausman test which is proposed by Hausman (1978) about the correlation between regressors and the individual effect. This is an important test to check weather observed and unobserved explanatory variables are correlated. Even the estimators are correlated with the individual effect fixed effect estimator is consistent but random effect

[23] See the Appendix 3A for more detail.

is not. So we test null hypothesis that individual effect and explanatory variables are uncorrelated against the alternative hypothesis where individual effects and explanatory variables are correlated. Based on the Hausman test we reject the null hypothesis and statistically prefer the fixed effect estimation.

3.4.3 Generalized Method of Moment (GMM)

As suggested by Anderson and Hsiao (1981) Generalized Method of Moment can be used to estimate the dynamic model with instrumental variables in the first differenced fixed effect model.

The generalized method of moments is a very general statistical method for obtaining estimates of parameters of statistical models. It is a generalisation, developed by Lars Peter Hansen of the method of moment. The GMM estimator is widely used in the estimation of the dynamic panel data model in recent years (Bond et al, 1997; Hall et al, 1998;Ozkan, 2001). GMM can be used to estimate the dynamic model with instrumental variables in the first differenced fixed-effect models suggested by Anderson and Hsiao(1981). We now move on to the discussion of this method[24].

3.4.3. 1 Description

The idea of the GMM is to use moment conditions that can be found from the problem with little effort. Like any other estimation methods, such as OLS and maximum likelihood (ML), require a theoretical relation that the parameters should satisfy. By choosing parameter

[24] See Appendix 3A for the detail discussion.

estimates, the sample correlation between the instruments and the function of parameters is satisfied as closely as possible. The theoretical relation is replaced by its sample counterpart and the estimates are chosen to minimize the weighted difference between theoretical and actual value.

3.4.3.2 GMM estimator in the first difference equation

There is evidence[25] that OLS method is inappropriate to estimate our dynamic model. First, the serial correlation test reveals that the assumption of serially uncorrelated errors is violated and this suggests some degree of misspecification. Second, there is evidence of a negative coefficient of the lagged dependent variable in the OLS level specification. This is surprising since the lagged dependent variable is expected to be biased upward due to correlation with the unobservable fixed effects. In the presence of firm specific effects OLS coefficients are biased assuming that α is unobservable and covariances between regressors and α are nonzero (Hsiao, 1986). Also, OLS will result in inconsistent estimation of the coefficient parameters since $y_{i,t-1}$ will be correlated with α_i which is constant. In order to eliminate the specific effects it is required to take the difference and avoid this problem. OLS regression does not consistently estimate the parameters because ($y_{i,t-1}$- $y_{i,t-2}$) and (ε_{it} - $\varepsilon_{i,t-1}$) are correlated through terms $y_{i,t-1}$ and $\varepsilon_{i,t-1}$. Anderson and Hsiao(1982) recommended a consistent estimation technique which requires using $\Delta y_{i,t-2}$ = ($y_{i,t-2}$- $y_{i,t-3}$) or $y_{i,t-2}$ as instruments for the first difference of the lagged dependent variable where both are correlated with ($y_{i,t-1}$- $y_{i,t-2}$) but uncorrelated with (ε_{it} - $\varepsilon_{i,t-1}$). If the error term ε_{it} in levels is not serially correlated the instrumental variable estimation will result in consistent estimates. As it fails to utilize all the

[25] See Bond (2002).

available moment conditions the instrument variables estimation does not essentially lead to efficient estimates of the model parameters.

Generalized Method of Moments (GMM) estimation technique use Arellano and Bond (1991) which employs additional instruments obtained by utilizing the orthogonality conditions that exist between the lagged values of the dependent variable and disturbances. They study the performance of these estimators and show that the GMM estimates result in smaller variances than those associated with the Anderson and Hsiao type instrumental variable estimators. The GMM estimators allows the instruments to use in each period to increase as one moves through the panel, whereas the Anderson and Hsiao type estimators uses only $\Delta y_{i,t-2}$ to instrument $\Delta y_{i,t-1}$. The set of valid instruments change depending upon the assumption concerning the correlation between X_{ikt} and $\varepsilon_{it.}$ It is suggested that the valid instruments for period t for the equation in first differences will be $Z_{it} = (y_{i,\ldots.,} y_{i,t-2,} X_{ik1,\ldots,} X_{ik,t-1})$ under the assumption that $\varepsilon_{it.}$ is serially uncorrelated, and X_{ikt} is predetermined. That is ,$E(X_{ikt}\, \varepsilon_{is}) \neq 0$ for all t,s then all X's are valid instruments. In this case Z_{it} become $(y_{it,\ldots.,} y_{is,} X_{ik1,\ldots,} X_{ikT})$ where s = 1,….T-2.

3.5 Empirical Model

Relaxing of Modigliani and Miller (1958) perfect market preposition explain that firms have to face transaction cost and provided that they have a target debt ratio. As they can not automatically adjust to this target debt level they follow the target adjustment process. The target long-term debt ratio of firms is taken to be a function of certain factors explained by theory, country specific factors and overall economic condition. This can be express as follows:

$$DR_{it} = \beta_1 + \sum \beta_i x_{it} + \varepsilon_{it} \quad (3.1)$$

where firms are represented by subscript i = 1,…..N, and time by t = 1,….T. In the model leverage ratio, DR is explained in terms of K explanatory variables x_1 ,…., x_k. Disturbance term ε_{it} assumed to be serially uncorrelated with mean zero and possibly heteroscedastic. β_k's are the unknown parameters of interest.

When considering the presence of adjustment cost firms do not automatically adjust their debt levels but instead follows target adjustment process. The simple form of the target adjustment model states that changes in the debt ratio are explained by deviation of the current ratio from a target. Therefore when incorporating adjustment costs firms do not automatically adjust their debt level but instead follow a target adjustment model.

$$DR_{it} - DR_{i,t-1} = \beta (DR^*_{it} - DR_{it-1}),\ 0 < \beta < 1 \quad (3.2)$$

The regression specification is

$$\Delta DR_{it} = \alpha + \beta (DR^*_{it} - DR_{it-1}) + \varepsilon \quad (3.3)$$

where: $DR^*_{i,t}$, the target debt to assets ratio of firm i at time t. β, the target adjustment coefficient. If the transaction cost is zero (i.e. if β=1), then $DR^*_{it} - DR_{i,t-1}$ and the firm automatically adjust its debt level to the target debt level triggered by the absence of transaction costs. On the other hand, if β=0 then $DR_{it} = DR_{i,t-1}$, and it implies that transaction cost is too high and no firm adjust their debt level, thus remaining in the debt level of the previous period. When the value of β is between 0 and 1, firms adjust their debt level in a way that is inversely proportional to the transaction costs.

We are going to test whether the capital structure of the firm expressed by the ratio of total debt to total assets depend upon its size, future growth opportunities, profitability, operating risk, non-debt tax shields, net debtors and collateral assets. In addition to the above mentioned firm specific factors the macro economic factors such as real interest rate, growth rate and inflation rate are chosen in order to measure the effect of time-specific factors on the capital structure decision of SME's.

The theoretical model of capital structure, which is a function of internal and external variables, can be written as

$$DR_{i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 FGO_{i,t} + \beta_3 PRO_{i,t} + \beta_4 OR_{i,t} + \beta_5 NDTS_{i,t} + \beta_6 ND_{i,t} + \beta_7 CA_{i,t} + \beta_8 GR_t + \beta_9 IR_t + \alpha_i + \varepsilon_{i,t} \quad (3.4)$$

where: $DR_{i,t}$, the debt to assets ratio of firm *i* at time *t*; $SIZE_{i,t}$, the size of firm *i* at time *t*; $FGO_{i,t}$, future growth opportunities of firm *i* at time *t*; $PRO_{i,t}$, the profitability of firm *i* at time *t*; $OR_{i,t}$, the operating risk of firm *i* at time *t*; $NDTS_{i,t}$, the non debt tax shield of firm *i* at time *t;* $ND_{i,t}$, the net debtors of firm *i* at time *t,;* $CA_{i,t}$ is collateral assets of firm *i* at time *t*; GR_t, growth rate of the economy at time *t,*; IR_t, inflation rate at time *t,*; α_i represent unobservable firm and/or industry specific fixed effect; and $\varepsilon_{i,t}$, is the error term.

Capital structure decisions are dynamic by nature and should be model as such in empirical analysis. Under the dynamic framework, this study will estimate the dynamic capital structure

model by employing a much stronger GMM[26] estimation technique as proposed by Anderson and Hsiao (1982), and Arellano and Bond (1991).

Combining the above (3.3) and (3.4) yields:

$$DR_{i,t} = \beta_0 DR_{i,t-1} + \beta_1 SIZE2_{i,t} + \beta_2 FGO_{i,t} + \beta_3 PRO_{i,t} + \beta_4 OR_{i,t} + \beta_5 NDTS_{i,t} + \beta_6 ND_{i,t} + \beta_7 CA_{i,t} + \beta_8 GR_t + \beta_9 IR_t + \alpha_i + \varepsilon_{i,t} \quad (3.5)$$

We employ the above dynamic model to estimate the determinants of long term target debt ratio for SMEs in the UK. α_i captured the unobservable characteristics of the firm that have significant impact on the firm's capital structure decisions. They vary across firm but are assumed to be constant for each firm. In particular the effects of managerial attitude such as ability and motivation or attitude towards risk. They may also capture the time- invariant industry effects that are specific to the industry in which the firm operates such as entry barriers and factor market conditions. According to Baltagi (1995) this specification is required when the purpose of the test is to examine set of firms and make inference within this set. In the above model 3.5 we have modelled the target debt ratio as a function of firm specific and macroeconomic variables[27].

Equation 3.6 shows the equation for firm specific variables where α_t represents firm invariant time specific effects and all other variables are same as equation 3.4.

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[26]Arellano and Bond (1991) takes in to account firm specific heterogeneity and endogenity of regressors and suggested that GMM is the most appropriate estimator. We have used GMM first difference estimator of Arellano and Bond(1991).

[27] In order to capture the industry effects on leverage we have also included industry dummy variables in this model but the estimated coefficients of industry dummy variables of all the industries except business or services sector are statistically insignificant. Therefore we have not reported the results of industry level.

$$DR_{i,t} = \beta_0 DR_{i,t-1} + \beta_1 SIZE2_{i,t} + \beta_2 FGO_{i,t} + \beta_3 PRO_{i,t} + \beta_4 OR_{i,t} + \beta_5 NDTS_{i,t} + \beta_6 ND_{i,t} + \beta_7 CA_{i,t} + + \alpha_t + \alpha_i + \varepsilon_{i,t} \quad (3.6)$$

In order to check the robustness of our results, we have used the same regression as (3.5) above but the size is replaced with the other measure of size and use a size dummy. To measure the impact of firm size on determinants of capital structure of SMEs in the UK we interact the size with all other variables. In other words we investigate whether the size of the firm affects the determinants of capital structure using the equation 3.7.

$$DR_{i,t} = \beta_0 DR_{i,t-1} + \beta_1 SIZE_{i,t} + \beta_2 SIZE\ Dummy_{i,t} + \beta_3 SDDR_{i,t-1} + \beta_4 SDPRO_{i,t} + \beta_5 SDOR_{i,t} + \beta_6 SDFGO_{i,t} + \beta_7 SD\ NDTS_{i,t} + \beta_8 SD\ ND_{i,t} + \beta_9 PRO_{i,t} + \beta_{10} OR_{i,t} + \beta_{11} FGO_{i,t} + \beta_{12} NDTS_{i,t} + \beta_{13} ND_{i,t} + \beta_{14} INT_t + \beta_{15} GR_t + \beta_{16} IR_t + \alpha_i + \varepsilon_{i,t} \quad (3.7)$$

where: $DR_{i,t}$, the debt to assets ratio of firm *i* at time *t*; $SIZE_{i,t}$, the size of firm *i* at time *t*; $SIZE\ Dummy_{i,t}$ (SD) is a 0,1 dummy variable, $SDDR_{i,t-1}$ is SD*$DR_{i,t}$, $SDPRO_{i,t}$ is SD* $PRO_{i,t}$, $SDOR_{i,t}$ is SD*$OR_{i,t}$, $SDFGO_{i,t}$ is SD*$FGO_{i,t}$, $SDNDTS_{i,t}$ is SD*$NDTS_{i,t}$, $SD\ ND_{i,t}$ is SD* $ND_{i,t}$ $FGO_{i,t}$, future growth opportunities of firm *i* at time *t*; $PRO_{i,t}$, the profitability of firm *i* at time *t*; $OR_{i,t}$, the operating risk of firm *i* at time *t*; $NDTS_{i,t}$, the non-debt tax shield of firm *i* at time *t;* $ND_{i,t}$, the net debtors of firm *i* at time *t,;* INT_t, real interest rate at time *t*; GR_t, growth rate of the economy at time *t,*; IR_t, inflation rate at time *t,*; α_i represent unobservable firm and/or industry specific fixed effect and $\varepsilon_{i,t}$, the error term.

3.6 Data and Sample

Data covers nine industries of the UK economy and macroeconomic data such as GDP growth, inflation and real interest rate. All the data used in this study was gathered from the Financial Analysis Made Easy (FAME) database of UK firms and from Bank of England.

Table 3.2
Sample Distribution by Sector Classification

Sector	**No. of Companies**	**% of Companies**
Agriculture Forestry and Mining	244	6.1
Manufacturing	463	11.6
Construction	801	20.1
Wholesale and Retail Trade	702	17.6
Hotels and Restaurants	182	4.6
Transport and Communication	232	5.8
Business or Services	692	17.4
Education health and Social work	334	8.4
Other	334	8.4
Total	3984	100

This study makes use of 3984 firms that satisfied the definitional and data requirements for this research. Researcher selected the sample using simple random sampling procedure to represent all firms (except finance sector) representing following industry categories in order to avoid the biasness (see Table 3. 2). Agriculture, Forestry and mining, Manufacturing, Construction, Wholesale and retail trade, Hotels and restaurants, Transport and communication, Business or services, Education health and social work and other. Financial firms such as banks, insurance companies and credit unions are excluded from this study because these firms tend to have their own characteristics due to specific financial behaviour and the nature of the business (Rajan and Zingales, 1995; Wald, 1999). Firms selected for the

study across different industries have missing data due to age of existence of the company and availability. Therefore, researcher selected panel data which consisted at least three years of complete information available for the study over the period of 11 years from 1998-2008[28]. All firms in the selected sample are small companies which are defined in Chapter 2. Descriptive statistics are given in the Table 3.3.

Table 3.3 Descriptive Statistics

Variable	Mean	Std. Dev	Min	Max	N
TDR	0.373	0.309	0.021	0.897	38856
LDA	0.109	0.189	0.000	0.814	16934
SDA	0.264	0.238	0.017	0.976	35921
Size	5.85	6.78	0.057	10.32	36228
Profit	0.067	0.239	-1.45	0.748	39065
OR	0.189	0.103	0.000	0.764	38564
FGO	0.007	0.0426	0.071	0.871	34828
NDTS	0.071	0.065	0.000	0.162	34321
Net Debtors	0.076	0.171	-2.34	0.756	36298
CA	0.478	0.239	0.004	0.989	36846

The table reports sample mean, standard deviation, minimum and maximum for the period 1998-2008. TDR is the total debt divided by total assets, LDA is long term debt divided by total assets, SDA is sort term debt divided by total assets. Size is the log of total assets, Profit is EBIT divided by total assets, OR is variation in profitability divided by the total assets, FGO is intangible assets divided by the total assets, NDTS depreciation to total assets, Net Debtors is the debtors minus creditors divided by the total assets and CA is the tangible assets divided by total assets.

Descriptive statistics of the private firms is shown in the Table 3.3. This shows that private non-financial SMEs have a high leverage at 37.3% average. Long term debt represent 10.9% and short term debt represent 26.4%. It is interesting to compare the level of leverage with the other studies that have been conducted based on the small business context in the UK. Rajan and Zingales (1995) report in the context of US and German firms have similar mean leverage of around 0.38. Michealas et al (1999) report that for UK mean of leverage is 42% for 1988-

[28] See Appendix 3B for the Number of Firms stratified by Years and 3C for Correlation matrix .

1995 period suggesting that SMEs in the UK have changed their financing choice from debt to equity or retained earnings.

3.7 Definition of Variables

Profitability is the ratio of profits before interest and tax to total assets (Chittenden et al.,1996a, Titman and Wessels 1988)

Size refers to the Total Assets (Titman and Wessels 1988).

Net Debtors refers to the ratio of debtors less creditors to total assets.

Non Debt Tax Shield is indicated by the depreciation charges to total assets.(Bradley et al., 1984).

Future Growth Opportunities are measured by the ratio of intangible assets to total assets (Long and Malitz,1985)

Operating Risk is defined as the coefficient of variation in profitability over the whole period.(Titman and Wessels 1988; Micheals et al, 1999).

Collateral Assets refers to the tangible assets to total assets Rajan and Zingales (1995) (Michaelas et al(1999)

GDP growth is measured as the percent rate of increase in real gross domestic product.

Inflation rate is the rate of increase of a price index.

Size Dummy this is a 0, 1 dummy variable which is defined based on the definition for SME. If firms no. of employees greater than 50 and turnover equal or greater than 50million Euro or balance sheet total equal or greater than 43 million Euro, dummy equal 1, otherwise 0.

Total Debt Ratio refers to the total debt to total assets (Michaelas et al, 1999, Ozkan, 2001)

3.8 Results and Discussion

We present in Table 3.4 parameter estimates for the equation (3.5) and (3.6) using the complete sample. To account for the impact of internal variables on the determinants of capital structure we estimate GMM2 using equation 3.6 which includes time dummies. Table 3.4 reports the GMM estimates of the dependent and explanatory variables. In all models, all the variables except the lagged dependent variable are treated as exogenous. We report two Wald tests where Wald test 1 is a Wald test for the joint significance of the estimated coefficient which is asymptotically distributed as chi-square under the null of no relationship and Wald test 2 is a Wald test for the joint significance of the time dummies. m1 and m2 show first order autocorrelation and second order autocorrelation of residuals which is asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan test of over identifying restrictions which is asymptotically distributed as chi-square under null of instrument validity.

With regard to the explanatory variables the results indicate that the majority of the coefficients have the expected signs and are significant. As expected the coefficient of lagged dependent is positive and significant at the 1% level. Regarding the diagnostic test the results of our GMM estimations find that the test for second order autocorrelation is .652 and .582 respectively for GMM1 and GMM2 which indicates that first order or second order autocorrelation does not exist for residuals. The Sargan (.736 and .687) test shows that instruments are correct and our model is correctly specified.

Table 3.4
Estimates of Capital Structure

Dependent variable DR Independent Variables	**GMM(1)**	**GMM(2)**
DR(-1)	0.3673 [0.000]***	0.4171 [0.000]***
Size	1.68E-08[0.001]***	8.96E-09 [0.027]**
Profitability	-0.0601 [0.001]***	-0.0437 [0.000]***
Operating Risk	0.0038 [0.001]***	0.0016 [0.412]
FGO	0.3211 [0.007]**	0.2346 [0.009]**
NDTS	3.65E-08 [0.145]	4.49E-08 [0.131]
Net Debtors	-1.45E-08 [0.107]	-1.84E-08 [0.213]
CA	0.213 [0.037]**	0.328 [0.078]*
Grate	0.0101 [0.019]**	
Inflation	0.0016 [0.000]***	
Adjusted R-squared	0.831	0.786
No of observations	34234	32467
Wald Test 1(df)	1472.92(11)***	652.78(8)***
Wald Test 2(df)		53.21(11)***
m1	-8.293	-7.875
m2	.652	.582
Sargan Test	.736	.687

Notes: Model 1 gives the GMM estimates in first difference and further lags are used as instruments. Model 2 gives the GMM estimates for firm specific factors in first difference and further lags are used as instruments. Wald test 1 for the joint significance of the regressors and Wald test 2 for the joint significance of time dummies. m1 and m2 first order autocorrelation and second order autocorrelation of residuals which is asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan test shows the validity of the instruments. ***, **, and * indicate coefficient is significant at the 1%, 5% and 10% level respectively. See also Table 2.3.

The estimation shows that there is positive coefficients for lagged dependent variable which indicate that firm adjust to long term financial target. This is consistent with the pecking order theory of financing activities which is empirically investigating the target adjustment model by Shyam-Sunder and Myers (1999) and Ozkan (2001), Mira and Gracia (2002), Antoniou

(2008) assuming that adjustment cost of increasing and reducing leverage is symmetrical. Further they have assumed that cost of moving back (if leverage is above the target) and moving towards (if leverage is below the target) is the same. The adjustment coefficient which is defined as one minus the value of the estimated coefficient of the lagged dependent variable, in the model 1 the adjustment coefficient is .63 and model 2 it is .58[29]. This implies that it is costly to achieve the optimal capital structure as speed of adjustment is inversely relative to the transaction cost.

The speed of adjustment[30] compared with the Ozkan (2001)[31] which is based on large firms in the UK, it shows that adjustment process is speeder for large firms than for the SMEs in the UK. This is not fair to compare these two results as the time period of these two studies are different and especially the credit terms for SMEs are much stronger than for large firms.

The coefficient of growth opportunities[32] is positive and consistent with the pecking order theory. This is in line with the other studies (Rajan and Zingales ,1995; Titman and Wessels, 1988) who use this proxy for growth opportunities. This implies that fast growing small firms are likely to have insufficient earning to finance their growth internally. The lack of

[29] The economic interpretation of this estimate suggest a *half- life*(See Iliev and Welch ,2010) for the influence of the shock which is log (0.5)/log.(0.63) =1.5 years which suggest an active managerial intervention. For GMM2 log (0.5)/log(0.58) =1.27 years which means better managerial intervention. Note that no systematic attempt hat yet been made in the literature to interpret the empirical results of the speed of adjustment except Iliev and Welch (2010).

[30]However Iliev and Welch (2010) find severe biases in comparing the performance of different estimators but do not propose a new estimator and try to reconcile speed of adjustment of existing estimators in their simulation analysis and concluded that average manager does not seem to move back to target debt ratio.

[31] Speed of adjustment is around 1.15 [log (0.5)/log(0.55)] for the UK large firms according to Ozkan (2001).

[32] We have tried to use other proxy for this (R&D expenses) but data is not available for majority of the firms.

enthusiasm of small business owners to issue equity, created by asymmetric information problems and control considerations on top of the relatively higher flotation costs, fast growing firms are likely to issue more debt. Findings are similar to other studies pertaining to the determinants of capital structure of SME's leverage in the UK (Michealas et al, 1999) Spain (Mira Gracia, 2002) and in India (Bhaduri, 2002). The plausible explanation of this association is that most UK SMEs operate in the trade and service sectors, where demand for working capital is relatively high. In order to meet the increasing requirement of working capital for growth, SMEs normally look for bank loans, trade credits from suppliers, friends or other resources. A positive relationship between growth and debt ratio in small firms is also reported by Michealas et al.(1996a) and Jordan et al. (1998), although both studies show up the relationship not to be significant. We find a significant positive relation between firm growth and the debt ratio, the growth factor has a relatively higher degree of impact on capital structure relative to the other significant factors in the model. It can be seen that a firm's growth is an important factor among determinants influencing leverage. In general, our findings support the hypothesis that growth is positively related to debt ratio.

As can be seen in Table 3.4, size positively effects the leverage of small firms. The positive relationship between size and total debt ratio indicates that larger the firm higher the gearing ratio. This implies that firm size has a strong influence on the way it finances its operations. Relatively larger firms will use more debt to finance their operations, and smaller firms will finance their operations more through their own equity and use less debt due to the higher financial barriers faces by small firms. Van der Wijst and Thurik(1993), Rajan and Zingales (1995) Chittendan et al.(1996) and Michaelas et al(1999) also report a positive relationship between firm size and debt ratio. Chittenden et al. (1996) suggest that, consistent with the

Pecking Order Theory, there is a positive relationship between firm size and source of financing, as smaller firms are more likely to rely on internal funds. Further empirical evidence of a significant relationship between firms' gross sales and use of debt is provided by Romano et al. (2001) and Gregory et al. (2005). Hence, our findings confirm the hypothesis and support the trade-off theory over the pecking order theory and imply that borrowing capacity of SMEs in the UK is significantly influenced by the financial distress risk. Titman and Wessels (1988) larger firms might be less risky and therefore less prone to financial distress and can generate more debt at lower interest rate. One possible clarification for this association is different stakeholders such as commercial banks, suppliers and clients in the market are more familiar with larger firms than small firms and therefore issues of information asymmetry are lessened for decisions on providing credit. Moreover larger firms have greater bargaining power than small firms when dealing with finance providers and therefore, larger firms have more opportunities to get bank loans, trade credit from suppliers and liabilities from other sources.

As far as profitability is concerned, our findings generally indicate that profitability has a negative relationship with all estimations. The estimated coefficient is significant at 1% level. The negative sign of profitability is consistent with the pecking order theory that predicts a performance for internal finance rather than over external finance. Since small firms will make use of internally generated funds as a first option, those which make use of external funds will be those with a lower level of profit. On the other hand firms with higher profits will use more internal funds and therefore need to borrow less. The same results also found by Van der Wijst and Thurik(1993), Chittenden et al.(1996a) and Jordan et al.(1998). Jenson (1986) argue that if the market for corporate control is effective in forcing firms to commit to

paying out cash by levering up. In such a market managers of profitable firms cannot avoid the debt financing and suppliers of debt could be more willing to lend firms with higher profits. But this is inconsistent with the view that the relationship between past profitability and leverage should also be negative as past profitability can be viewed as proxy for future growth opportunities (Shyam-Sunder and Myers, 1999).

Regarding the association between net debtors and capital structure, our finding show a negative coefficient and also statistically insignificant in the model one with macroeconomic variables. The negative relationship between net debtors and total debt ratio indicates that larger net debtors smaller the gearing ratio. This is contradictory from Michaelas et al (1999) and the possible explanation for this might be the rise in short term borrowing (more access) discourage long term borrowing (higher collaterals).

As far as non-debt tax shield is concerned, our findings generally indicate that non-debt tax shield has a positive relationship with all estimations of leverage. However, the coefficient on the debt ratio is statistically insignificant in the first model and it is just significant at 10% level in the second model where there are no macroeconomics variables. The positive coefficient indicates that the firms with higher level of non-debt tax shield (proxied as ratio of annual depreciation expenses to total assets) which can be deducted from the taxable income are expected to have more debt than other firms. For instance, firms with higher depreciation ratios are more likely to have a higher proportion of tangible assets and fewer growth opportunities in their investment opportunity set. This in turn implies a positive relationship between non-debt tax shield and debt ratio. Furthermore our results confirm this prediction.

The evidence emerges that the operating risk of firms exerts a positive influence on firm borrowing decision. This indicates that SMEs with higher operating risk tend to use more debt in general and short term liabilities in particular. Hypothesis is rejected although the relationship between risk and capital structure is found in this context to be positive rather than negative and conflict with the theory of financial distress. Queen and Roll (1987) and Petit and Singer(1985) report that bankruptcy cost will higher in small firms and therefore would expect a negative relationship between risk and debt ratio. Consistent with this results bankruptcy costs are not significant enough to guarantee a negative relationship between operating risk and debt ratio. The same relationship found the Michaelas et al.(1999) for UK SMEs.

On the other hand the empirical positive relationship between the operating risk and debt ratio of small firms, suggests that moral hazard problem outweighs the increased probability of bankruptcy. It follows that agency costs are lower in more risky firms due to lower underinvestment problems allowing such firms to depend on higher debt ratio. Jordan et al.(1998) found the same relationship and they suggest that this positive relationship appears to be confusing. According to them during this period small businesses faced a particularly hostile environment. The results strongly suggest that firm specific variable dominate all other blocks of variables.

Collateral asset is found to be positively related with debt ratio and statistically significant. One standard deviation increases in tangible assets increase total debt from 7.83%. This is quite similar to the value (8.76%) reported by Michaelas et al(1999) for SMEs in the UK. In order to overcome the informational opacity small firms can use collateral assets to attract

long term debt. However, this suggest that SMEs in the UK face high asset substitution problem as the level as long term debt is low and in order to avoid the agency cost issues they may have to use short term debt. Further this is consistent with Myers and Majlif (1984), Michaelas et al(1999) and Degryse (2009).

The estimated coefficient for GDP growth rate is positive as expected and significantly related at 5% level to leverage. This result indicates that during the period of high growth, firms borrow more. Hence, the findings confirm the hypothesis. Inflation is positive and significant at 1% level with the debt ratio and this implies that during an inflationary period firm employee more debt in capital structure in order to get the advantage of fall in real cost of debt. This result accepts the hypothesis.

Table 3.5 presents the regression coefficients and t-statistics of the time dummies which are included in the model 2 above in Table 3.4. According to the model 1 with macroeconomic variables and model 2 with only firm specific variables it is evident that small firms use debt

Table 3.5
Regression coefficients of Time Dummies

Year	**GMM(2)**
2000	-0.0011 (-0.381)
2001	0.0049 (1.712)*
2002	0.0027(1.681)*
2003	-0.0156 (-8.810)***
2004	-0.0349 (-13.918)***
2005	-0.0029 (-6.719)***
2006	0.0066 (17.139)***
2007	0.0576 (29.591)***
2008	-0.0071 (-5.932)***

***, **, and * indicate coefficient is significant at the 1%, 5% and 10% level respectively.

capital for short time period and paid off debt and might use the retained profit to finance their operations. Recent statistics by the British Bankers Association revealed that borrowing by the small firms in the UK has fallen by 14% since 1991 due to the financial pressure effect on small firms by the recession. Moreover they report that since the recession ended there has been a reduction in the external borrowing requirement of small firms which have been able to rely on retained earnings.

As a robustness check, we interact all variables with a size dummy. The results (shown in Table 3.6) are robust to the ones obtained previously.

Table 3.6
Regression coefficients of variables with size dummy

Dependent variable DR Independent Variables	**GMM(1)**
DR(-1)	0.339 [0.000]***
Size	1.61E-06 [0.000]***
Size Dummy(SD)	0.0538 [0.000]***
SDTDR(-1)	0.1521 [0.004]**
SDProfitability	0.0060 [0.009]**
SDOperating Risk	-1.491E-06 [0.098]*
SDFGO	0.0902 [0.203]
SDNDTS	-1.99E-05 [0.105]
SDNet Debtors	2.10E-06 [0.043]**
SDCA	-0.0021(0.039)**
Profitability	-0.0061 [0.000]***
Operating Risk	9.36E-08 [0.089]
FGO	0.1429 [0.002]***
NDTS	1.75E-05 [0.087]*
Net Debtors	-2.03E-06 [0.011]**
CA	0.167 [0.087]*
Grate	0.0069 [0.0654]*
Inflation	0.0008 [0.911]
Adjusted R-squared	0.763
No. of observations	29056
Wald Test 1(df)	1810.98(17)***
m 1	-8.103
m 2	.951
Sargan Test	.893

Notes: We report GMM estimates for firm specific factors in first difference and further lags are used as instruments. DR is the dependent variable and see Table 2.3 for description of other variables. Wald test 1 for the joint significance of the regressors and Wald test 2 for the joint significance of time dummies. m1 and m2 first order autocorrelation and second order autocorrelation of residuals which is asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan test shows the validity of the instruments.***, **, and * indicate coefficient is significant at the 1%, 5% and 10% level respectively.

As a robustness check the model (presented in Table 3.6) uses a size dummy variable in order to measure the impact of size on the capital structure of SMEs. Basically the sample is divided in to two based on the size. Furthermore, we multiply all other variables (except size) from the size dummy in order to see the influence of size. Unlike the results for the previous model explained in Table 3.4 above, the expected signs of some variables are different when size

dummy is introduced. But this result clearly indicates the significance of size on leverage. For instance, the uses of interaction term on the profitability variable show there is a positive relationship with leverage which means that higher the profitability of medium firms greater the leverage. Higher the profitability gives a signal to the debt capital providers that business is successful or survival is not uncertain which will make them favor the firm and increase the availability of loans etc. Size dummy is significant at 1% level and it again confirms that the relationship between size and total debt is positive. The sign of the interacted variable of CA is negative and significant at 5%. This explained further that bigger the size of the firm lowers the collateral requirement. F statistics (29.65) obtained on the interacted variables indicates that the coefficients are statistically different from each other.

3.9 Conclusion

The study presents a panel GMM model to explain firm characteristics and macroeconomic variables that affect capital structure of SMEs in the UK over the period of 1998-2008. Compared with similar studies this research not only examines the effects of determinants related firm characteristics, but also investigates the aspects of macroeconomic changes in making capital structure decisions and the speed of adjustment. We analyze whether the determinants of capital structure of SMEs are same for large firms and examine the determinants of target capital structure of firms and role of adjustment process. More specifically, lagged total debt ratio, firm size, profitability and FGO have a significant relationship with all measures of capital structure. Moreover, the lagged value of the dependent variable found to be a major determinant of capital structure. The result also suggest that the almost all the theories of capital structure are relevant to the SMEs in the UK.

The key finding of this empirical relevance of the capital structure theory to the small business sector, carried out in this study suggest the results are also consistent with the prediction of the theory. This study estimated the speed at which firms adjust their capital structure and which shows that firm have long term target debt ratio and they adjust to the target ratio relatively fast.

In addition, this paper give evidence which suggest that the capital structure of small firms in UK is time dependent. The results show that time effects influence the total debt ratio of small firms as well as the maturity structure of debt raised by small firms. Furthermore, macroeconomic changes are also significantly affecting the capital structure of small firms and total debt ratio exhibit a positive relationship with macroeconomic variables.

Another important finding of this study is the size effect. When the firm becomes larger, they become more diversified and failure risk is reduced as they can access higher leverage. Information asymmetry makes small firms more difficult in accessing the external finance and they would face a higher interest cost. Moreover, these source of finance would be financially more risky and this would restrict small firms accessing debt finance and ultimately it will affect the growth of the small firm.

Macroeconomic factors seem to have important impact as firm level factors in determining capital structure. As country become richer firms continue to be financed by debt. The GDP growth rate and inflation has a huge effect on the leverage decision of the firm. Growth of the GDP provides better financial opportunities for especially for SMEs and this would increase the leverage.

The study further confirm that small firms be likely to use retained profits as much as possible and then go for debt capital only when additional finance is essential. Hence we conclude that the estimated coefficients on the firm specific variables of size, profitability, operating risk, future growth and collateral assets are consistent with the explanation of the pecking order theory.

Besides the government policy makers and financiers have to recognize that the borrowing requirements of SMEs are not stable over time. Relatively there appear to be some variation in the borrowing needs of small firms that may be related to changes in the broader economic conditions of the marketplace. Therefore government policies of financiers may have to vary over time to match with the changing borrowing requirements of small firms.

CHAPTER 4

DETERMINANTS OF COST OF DEBT OF SMEs IN THE UK.

4.1 Introduction.

The previous chapter focused on the capital structure decision of SME's, while in this chapter attention is made to another crucial issue for SMEs namely the cost of debt capital. More specifically, the objective of this chapter is to empirically study the determinants of cost of debt of non- financial SMEs in the UK. Better understanding of cost of debt determinants should result in more accurate capital budgeting decision and create a better alignment between manager's compensation and shareholder value creation. Evidence suggests that the vast majority of SME's find it difficult to attract the levels of external finance required to fund the growth options (Binks and Ennew,1997). Cost of capital literature provides plenty of discussions of the determinants of cost of capital (Omran and Pointon,2004; Blass et al, 2004; Gregory and Rutterford,2001), but very little attention has been given to the cost of debt.

The objective of this study is to carry out an empirical testing using panel data methodology to determine the factors that explain the cost of debt in non- financial SMEs in the UK for period of 1998-2008.

We present some background information on the cost of debt in section 4.1. In section 4.2, we discuss the theoretical background of our study. In section 4.3 we review some of the empirical studies, we describe our model of cost of debt in section 4.4 and methodology in

section 4.5. Dataset and other relevant information we presented in section4.6. In Section 4.7 we present summary statistics for the full sample and according to the various classification schemes we use and discuss our empirical results. Section 4.8 concludes.

4.2 Review of Literature

The objective of this section is twofold. First in section one (4.2.1) is to uncover the important theoretical foundation relating to the cost of debt determinants. The next section (4.2.2) provides review of the previous studies relating to the determinants of cost of debt capital.

4.2.1 Theoretical Background

The combination of internal and external financial resources in company funding has generated disagreement over the years. MM important contribution to capital structure theory of 1958, which showed that, given a company's investment policy, and not taking taxes and transaction cost in to account, the choice of financial policy does not affect the current market value of the company is very significant. However, real markets are far from the supposed "perfect capital markets" on which MM based their work and numerous studies have proved the interdependence among investment decisions, financing decisions and firm value. Further the MM proposition (1958 and 1963) highlighted the important issues involving financial decision such as cheaper cost of debt compared to equity; the increase in risk and in the cost of equity as debt increases, and the benefit in situation where taxes are paid. With taxes and deductibility of interest expenses MM concluded that firms should use as much debt capital as possible.

The basic theories that have dominated the cost of debt capital are the trade off theory, theory of information asymmetry and agency theory. Cost of debt of a firm is also determined in the capital markets according to the risk–return trade off. Greater the risk, the greater the interest rate that will be required. The trade off theory refers to the idea that marginal benefit of the source of finance is equal to the marginal cost of the same. The firms debt-equity decision as a trade-off between interest tax deductions and cost of financial distress is controversy about how valuable interest deductions are and what kind of financial trouble are most threatening. This trade-off between debt and equity depends on the tangible assets of the firm and taxable income. Unprofitable companies with risky intangible assets should rely primarily on equity financing. According to the trade-off theory, high profits should mean more debt-servicing capacity and more taxable income to shield and must give a higher target debt ratio. As explained in the chapter 2 the trade-off between cost and benefit shows why companies do not have 100% debt as expected from MM (1963). So the firms optimal capital structure is determined by the trade-off between the tax advantage linked with debt and the increased bankruptcy risk associated with higher leverage. Firms select optimal capital structure by examining the net tax advantage of debt financing by comparing debt advantages (tax shield benefit, the disciplinary role of debt on managers, Jensen and Meckling (1976) compared to equity finance cost relatively low information cost) and the drawback (due to information asymmetry between shareholders and creditors, the cost of bankruptcy due to higher debt and the cost of financial distress), Dobrica (2007). There is disparity among the researchers on what represents the cost and benefit of debt.

Compared to the existing shareholders, the bondholders have no voting right which is one of the benefits of debt. So that external debt is more attractive from the point of controlling

power[33]. The owners of the firm do not share their control when debt financing is used. The most distinct feature of control of firms in general, and SME in particular, is the family ownership as debt does not dilute the owner's ownership interest in the company.

In addition, the other most important benefit of debt is tax deductibility on the company tax return, lowering the actual cost of the loan to the company Cost of debt of an unprofitable company that pays no taxes would have the total cost before tax. If the interest payments on debt are to deduct for tax purposes the reported earning must be zero or positive. If reported earnings are sufficient the firm receives a tax refund. High leverage can increase the uncertainty of the tax shield associated with the debt for the company. As explained by Holmes et al (2004) if the firms earnings decline so that the tax deductibility of interest payments is postponed or lost, the cost of debt funds to the company overall rises dramatically. So the advantage of tax deductibility is depends on firms earnings.

There are certain factors such as taxes, which favor a company's use of debt, but others such as the cost of bankruptcy, that limit the tax advantage. In this manner, it may be said that agency[34] and signal theories offer considerable help in understanding a company's use of debt. Specially, the use of debt may reduce management discretion and mitigate conflicts of interest between management and the contributors of funds to the company. Moreover, as a

[34] To pursue their personal agenda shareholders may go for risky investment which raises the default risk. When a firm has debt capital, it arises conflicts of interest between stock holders and bond holders which impose agency cost on firm which lower the market value of the firm. Going for risky investment finally cause debt holders to raise their interest rate which in turn increase the cost of debt capital as well as total cost of capital.

[34] Agency theory predicts that debt reduces the conflicts between manager and owners as it increase the fraction of management's ownership. As debt agreement restricts managers' freedom, it is valuable and changes the policies.

consequence of separating ownership and management, shareholders have less information about the company than do managers. In the specific context of debt capital, cost of debt capital is mainly associated with the possibility of default and availability of realistic information for accurately estimating the default risk. By reducing the information asymmetry between firm and lenders, firms can reduce the cost of debt capital. Especially for the interest rate charges by the lending institutions is decided by the detailed information provided by the firm. For large public firms, such information is readily available and can be generated at lower cost instantly. However such information is not readily available or externally verified for all SMEs. Since the lending institutions have to add this information collection cost to the loan applicant small firm will have to pay a higher cost than large firms. This causes to increase the interest rate charges to small firms. This idea is supported by Stiglitz (1988)[35].

Stiglitz and Weiss(1981) argue that as credit rationing profitable projects do not have access to finance at the same time the other projects with the same profitability would have. This arises the consequence of bankers and borrowers having different information about the same projects which is known as the asymmetric information leading to the phenomenon known as adverse selection and moral hazard.

Storey (1994) shows four other factors that related with SMEs on credit rationing which are directly linked with the Stiglitz and Weiss(1981). The high fixed cost of information, variety

[35] Stiglitz(1988) explain that small business have to pay very high interest rate as the bank consider the probability of default is very high. This happens because of misclassification (the greater the uncertainty leads to greater errors in classification) of borrowers and further he explains that the cause for the higher interest is that the credit market is not a pure price market.

of credit conditions such as interest rate, terms and other conditions used by banks to compare, different attitudes, skills and motivation of entrepreneurs show and the high mortality rate of the SMEs. In understanding the credit rationing process it is useful to describe the decision process of banker to maximize the benefit without any risk and perfect information. As bank has limited information and limited control over the borrowers' actions bank use collaterals as a way to reduce the risk of default and maximize the return. Collateral provides an incentive to the entrepreneur to seek less risky projects consequently the banks respond to the adverse selection and moral hazard by seeking collateral.

The expected return of the bank is entirely depending on the particular firms' perception on risk. So the cost of debt (interest) that the borrower is willing to pay does not represent reliable measure of risk as asymmetric information obstruct the banker to know the profit of the project which is known by the borrower. Diversity of business in between the SME sector which is not a problem in itself but the complexity to manage the information in more effective way making the bank more effort which make the evaluation more costly.

As Stiglitz and Weiss (1981) point out due to the credit rationing among loan applicants who appear to be identical some receive and some do not, even if they offered to pay a higher interest rate. This probability is higher for SME sector due to the atomization observed by type of business. The high fixed cost of information will be more affected to SME as this cost is independent of the amount of loan. The attitude of the banker that the borrower would deviate from the original objective is much higher in particular for SMEs due to the less monitoring throughout the project life.

In this way, leverage becomes a signal to the former of the private information in the hands of the latter since the directors desire to avoid the problems of bankruptcy convert debt into a believable signal (Padron, 1999). Besides, since funding comes from different sources for SME (credit market for SMEs and capital markets for large companies) it would make more sense to study further what determine the cost of debt capital of SMEs.

The agency theory which is directed at the ubiquitous agency relationship, in which one party(the principle) delegates work to another (the agent), who perform that work(Jenson & Meckling, 1976). Agency theory is concerned with mainly resolving two problems that can occur in agency relationships. First, the agency problem that arises when the desires or goals of the principle and agent conflict. Second, when it is difficult or expensive for the principle to verify what the agent is actually doing. The problem here is that the principle is unable to verify that the agent has performed his duty appropriately. The other conflict is over risk sharing which arises when the agent and principle have different attitude towards the risk. Agency theory suggests that the debt capital should reduce the conflicts of interest between managers and owners as there is a commitment to pay out more cash (Jensen, 1986) and managers readiness in over investing in risky investment projects to advance their self interest can be controlled by employing more debt capital through debt agreements. On the other hand there is agency related cost of debt which arises through the risk sharing. Even though the cost of debt (return of debt holders) has been fixed, engage in risky investment projects by managers would lead to debt becoming more expensive and less available as a future source of finance. Risk sharing (shifting) behavior can effect the interest rate required by the debt providers demanding higher rate. In addition to that this could be a cause of losing the reputation of the firm as debt providers requiring a higher interest for their money for bearing

higher risk which result in acquiring risky investment projects by the managers. This is due to the unsuccessful projects where the cost is shared among all security holders.

Response of the debt holders for the risk sharing may again depend on the size of the firm as well. Asset structure of the firm shows the ability of the firm to assure the debt holders wealth. In relation to the SMEs the risk sharing would not be easy as the asset structure and the variability of the cash flow from the use of the assets may be altered. Investment of SME may not be in wide range of projects where the growth options are less due to the size of the firm. This may lead to debt holders to expect higher return from SMEs as they bear a higher risk. Giannetti (2003) argue that larger the size of the firm would be, higher the cost of external finance if the financial system does not favor risk sharing. This explains the opposite relationship between the size of the firm and the cost of debt capital.

Following the above discussion about the cost of debt which is relating to the risk sharing behavior of security holders might be higher for the SMEs. However, this is not the only agency related cost of debt. When a firm has debt, the conflicts of interest between managers and owners impose agency cost on the firm which lowers the market value of the whole firm. The agency cost of debt is consistent with the theory of asymmetric information where the both theories addresses the role of information. This recognizes that management at all times knows more about the business than owners do and this information asymmetry is one of the key factors that allows management to pursue goals that are divergent from shareholders' interests.

It is clear that these theories explain the cost of debt capital in different aspects. Higher the firm debt is higher the financial risk link to the business, and consequently cost of debt is higher. A higher interest rate either imply riskier applicants (the adverse selection effect) or influences borrowers to choose riskier investments[36] (the incentive or moral hazard effect) in order to gain higher return.

As mentioned earlier, adverse selection and moral hazard may have a sizeable effect when firms are young or small, which would explain why it is difficult for them to finance through the public markets. However, through close and continued interaction, with the finance provider a firm may provide a lender with sufficient information and awareness about the firm's affairs so as to lower the cost and increase the availability of credit. Simply the cost depends on the age, reputation and the length of the financial relationship with the lender. To distinguish these theories as possible explanation to the cost of debt determinants it is important to investigate the firm characteristics, default risk, agency cost and information asymmetry problems.

4.2.1 Review of selected empirical studies

As per the previous discussion it is understandable that most models and analyses build assuming that SMEs are heterogeneous set of business with little information available for the fact that can be used to the creditworthy. According to a recent report of British Chamber of Commerce (BCC, 2008) debt finance is an attractive option for businesses who are reluctant to compromise their control over the new investment. There is well known reluctance in debt

[36] This provides an incentive to the entrepreneur to commit him to the project because higher the riskiness of the project need to provide suitable collateral to the lender.

financing of SME rather using the savings or investment from family and friends. Smaller firms will often rationalize financial decision in a hierarchical fashion which is known as Pecking Order Framework[37](Chittenden et al,1996a). Certainly, there is a strong support in the theoretical aspect of cost of debt capital for employing higher amount of debt in order to enhance the value of the firm.

As Diamond (1991) predicts, the impact of information asymmetries vary according to the firm size. Small firms, those without well established reputations use bank debt when they have little private information. Large firms with established reputations and access to public debt markets choose high concentration of bank debt when they are difficult for outsiders to observe. Differences in characteristics among firms of different sizes of firms suggest that firms face changing borrowing opportunities as they grow. Diamond (1991) concludes that higher credit rating (low risk) and reputation is required for low interest rate and to borrow without monitoring. Certainly this supports the idea that cost of debt depend on the risk and reputation of the firms. Stiglitz and Weiss (1981) show that the interest rate charged, to an ex ante observationally equivalent group of borrowers, determines not only the demand for capital but also the riskiness of the borrowers. However, theory of credit rationing suggest that creditors may be unwilling to increase interest rate for borrowers with higher risk (Stiglitz and Weiss,1981)[38]. These contradictory findings lead large amount of related empirical

[37] First use the internally generated funds followed by debt and finally equity.

[38] In a competitive market prices are higher for uncertain borrowers than for certain borrowers as the lender has to incur additional cost in monitoring, assessing and covering possible bad debts. This implies that more risky projects would be charged a higher interest and low risk projects a lower interest rate. But Stiglitz and Weiss(1981) show that raising of interest where bank has less information about the expected success of the project than the entrepreneur can lead to lower the return of the bank. Because borrowers no longer find it worthwhile borrowing from bank as the bank charge higher interest rates.

research focusing on uncovering the relationship between cost of debt capital and firm specific factors.

Related literature has evolved from the MM approach, and on individuals (Myers 1977) as well as the financial distress derived from insolvency and bankruptcy risks (Brennan and Schwartz, 1978; Bradly, Jerrel and Kim,1984) to the most recent contributions, which take in to account the information asymmetries and conflict of interests between the agents involved (Jensen and Meckling, 1976). In other words it is the relationship between risk and return, the firm's capital structure directly affect its financial risk which can be describe as the risk resulting from the use of financial leverage.

Although these theoretical approaches deal with cost of debt from different perspectives, what they have in common is that they all study large corporations as opposed to medium and small enterprises (Michealas et al;1999). Many studies (Sengupta,1998; Koskela and Stenbacka,2004) are based on the large firms and studied the cost of debt capital in different perspectives. They consider the borrowing patterns, almost exclusively within the context of such large companies. But the specific features characterize SMEs make it difficult to apply most of the analytical tools. For instance, one of the most important differences between large and SME is the unavailability of long term funding through capital markets for SMEs and therefore the absence of market prices permitting objective assessment of their value (Osteryoung and Newqman, 1993). Such differences suggest a need to take a new look at the cost of debt and what factors determine the cost of debt capital of SMEs.

Different Implications of theories and empirical studies about the determinants of cost of debt capital of different countries and for different types of businesses have commonly included size, profitability, collateral assets, age, gearing, sales growth and taxes as the explanatory variables. Table 4.1 shows the results of selected number of studies. Panel A shows the summary results for the determinants of cost of debt and Panel B shows the definitions for the variable and key findings.

Table 4.1

Panel A: Summary results for the determinants of cost of debt

Variable	**Petersen and Rajan(1994)**	**Berger and Udell(1995)**	**Pittman and Fortin(2004)**	**Hanley and Crook(2005)**	**Burke and Hanley(2006)**	**Hyytinen and Pajarinen(2007)**
Size	(-)Larger firms pay lower interest rate	(-)Larger firms pay lower interest rate	(+)Find a positive correlation with interest rate.		(-)Size which measures using the projected sales shows that interest margins are significantly lower for larger facilities.	(-)Smaller firms pay higher cost of debt and larger firms pay lower cost of debt.
Profitability	(+)Low profitable firms pay less interest. The coefficient have the opposite sign to that expected.	Ambiguous	(-) Find a negative coefficient			(-) More profitable firms pay less for their external finance
Age	(-)Age of the firm has a	(-)Negatively related to	(-)As firm complete			(-)When a small

	little effect on the rate. Younger firms pay higher interest rate.	loan rate.	good credit histories interest rate will decline.			business ages 1 year cost of debt capital decreases by 1-2 basic points. It is a big reduction of cost of debt for a firm with an average amount of debt.
Collateral / Asset structure	(-)Collaterable assets give cost advantage.	(-)Higher the collateral lesser the loan rate.	(+)Interest rates are increasing in collateral.	(-)Collateral provision insure the bank against the downside risk of default.	U shaped relationship between interest margin and collateral	(+)find a positive relationship with cost of debt.
Gearing	(+)Higher the financial leverage increase the cost of debt. Thus leverage decreases with age but increases with size.	(+)Higher the leverage increase the loan rate.	(+)Higher the financial leverage increase the cost of debt.			
Liquidity		(+)Current ration shows a positive relationship with loan				

		rate. (-)Quick ratio shows a negative relationship with loan rate.				
Negative equity			(-)Negative equity reflect that firms experiencing financial distress may incur higher borrowing costs.			
Sales Growth	(-)Firms with multiple banks have lower sales growth.					
Creditworthiness						(+)Higher creditworthiness means higher the cost of debt capital.
Cash flow			Negatively related to cost of debt.			
Dummy(SME)						(+)Cost of debt is higher for SME than for larger firms.
Year			Not reported.			

Default on payment						(+)Default on payment supports the conventional wisdom and shows a positive relationship with cost of debt.
Length of the relationship	(-)Shorter the relationship higher the interest rate.					
Amount borrowed					(-)Higher the amount borrowed lower the interest	
Auditor choice			Negative and statistically significant. High quality auditor reduce the interest rate on debt.			
Quality of the enterprise					(+)This measures the ability of the lender to ascertain the borrowers real revealed quality. This is	

					positive and significant.	
Finance/purpose				(-) To measure the risk of different type of financing this variable is incorporated and this shows a negative relationship with the interest.	(+)Purpose of the loan means whether it is to cover working capital or to cover capital investment. This is positively related.	
Key Findings	*Borrowing from multiple lenders reduce the availability of credit and increase the cost of debt. * The length of the institutional relationship with firm have a little impact on the price.	*Borrowers with longer banking relationships pay lower interest rate and less like to pledge collateral. *Small firms are more dependent on banks for external finance. *Bank borrower relationship plays an important role in the pricing of	*Information asymmetry between lenders and borrowers is decreasing in firm age. *Choosing a Big Six auditor, which can reduce debt monitoring costs by enhancing the credibility of financial statements, enables young firms to lower their interest rates.	*A relatively fixed assets base, as seen in higher security to loan values for non first round finance raised the price and risk of successive financial increments. Customer is unable or unwilling	*Found a U shape relationship between interest margin and collateral. *Initially new ventures get cheaper credit by providing collateral however greater the amount of collateral means greater the risk. In order to compensate	*Cost of debt capital is higher for young firms. *When a small business ages one year its cost of debt capital decreases by 1-2 basic points. *Negative qualitative relation is robust controlling for cross-sectional

		loans to small firms with the possible exception of the very smallest borrowers.	*Duration of firms pre IPO histories affects interest rates in their post IPO years.	to move to a competing bank for follow-up finance. *Bank compensate for higher risk by charging a higher rate.	the risk lenders have to charge higher interest.	variation in unobservable creditworthiness of small firms and within-firm variation in their observable creditworthiness.

Source: Compiled by author from the selected review of literature

Variable	**Sengupta(1998)**	**Hooks(2003)**	**Holmes et al (1994)**	**Rand(2007)**	**Niskanen and Niskanen (2010)***
Size	(-)Size is negatively associated with the cost of debt. Because of the lower market risk large firm enjoy lower cost of debt.	(-)Negatively associated with the use of bank debt.	(-)Negatively related to interest.	(-)Negatively related to loan rate.	(-)Bigger firm pays low interest rate.
Issuer size	(+)Positively related with cost of debt. Economies of scale in underwriting suggest that the cost of debt measure would be inversely related to size of issue.			(-)Issuer size:The variable debt share is negatively related with interest rate.	
Profitability	(-) Firms with higher profit margin are expected enjoy	(-)Negatively correlated with bank		(+)Firms with higher profit share would have	(-)More profitable firm pays low interest

	lower cost of debt.	debt.		to pay higher interest cost.	rate.
Age		(-)Negatively correlated with bank debt.	(-) Negatively related to interest.	(-)Negatively related with interest rate.	(-)Negatively associated with interest rate.
Collateral		(+)Positive relationship with bank debt. The results suggest that fixed assets act as a proxy for observability of a firm.		(+)Positively correlated with interest rate.	(+)Positively related to the interest rate.
Gearing	(+)Firms with higher debt to equity are expected to have higher cost of debt.	(+)Positively related with bank debt.			(+)Firms with high debt to assets pay higher interest rate.
Size of the loan(Loan amount)				(+)Positively correlated with interest rate.	
Convert	(-)Convertible debt have a lower cost of debt.				
Subordinated debt	(+)Subordinated debt have a higher cost of debt.				
Business cycle	(+)This is to capture the risk premium over the business cycle.				

	Larger this differential, the higher is the cost of debt.				
Treasury Bill	Higher the TB rate higher the cost of debt.				
Interest ratio	Firms with higher time interest ratio are expected to enjoy lower cost of debt.				
Reputation		(-)Negatively correlated with bank debt as they are difficult to observe.			
STD of return	This is a proxy for market risk of the issuer so that it is expected to be positively associated with cost of debt.				
Sales growth and sales		(+)Sales growth-Positive which is not what the theory predict. But for medium firms it is negative.		(-)Sales growth-Negatively related to loan rate. Sales-Positively related with interest rate.	
Management					(+) Increase the management

ownership					ownership increase the cost of debt as it increases the risk.
Maturity period	(+)Longer the maturity is expected to have a higher cost of debt because of its greater risk exposure.				
Call	(-) Call is negatively associated with the cost of debt.				
Relationship				(+)Positively related with interest cost.	(-)Negatively related to the interest rate.
Location of the firm					(+) Urban firms pay higher interest than rural firms.
Disclosure	(-)Higher the disclosures lower the cost of debt.				

Key Finding	*Shows a statistically significant negative association between a measure of a firm's overall disclosure quality and two alternative measures of a firm's incremental borrowing cost. *Lenders and underwriters consider the disclosure quality in their default risk estimates. *Degree of details, timeliness and clarity of disclosure are perceived to have a lower default risk and over cost of debt. *Higher the uncertainty greater the reliance on disclosure.	*factors vary by the size of the firm. *Bank plays an important role in lending to businesses because of information asymmetries. *Both small and large firm find bank debt advantageous under appropriate circumstances. *Policy makers should consider the importance of reputation building services.	*Small firms pay more for term loans and lease funds than medium and large firms. *No identifiable trend in favor of any particular industry group stratified by size. *Different interest rates for different size categories.	*Larger firms get cheaper credit *Informal credit market plays an important role for fast growing firms. *probability of accessing the credit is higher in rural areas. *Borrower lender relationship reduces interest rate. *Collateralized lending face larger interest rate.	*Relationship between managerial ownership and interest margin on loan is non linear. Banks charge higher interest rates at medium level managerial ownership. *Firms with dispersed ownership structure have easier access to credit and less often required to pledge collateral.

Source: Compiled by author from the selected review of literature
*This study uses 3 dependent variables but in this review we have reported one variable only.

Table 4.1

Panel B: Definitions for the Variable and Key Findings

Variable	Petersen and Rajan(1994)	Berger and Udell(1995)	Pittman and Fortin(2004)	Hanley and Crook(2005)	Burke and Hanley(2006)	Hyytinen and Pajarinen(2007)
Sample, period and no. of observation.	3404 US firms from national survey of small business finance for 1988	3400 US SME for 1988	Firms which conducted IPO between 1977-1988. 371 firms	UK retail banks for commercial loans from 1998-1999. Maximum 961 observations.	214 application for finance from major UK banks from 1998-1999.	Small firms from 1999-2002. 47115 firms and 97437 observations.
Method	OLS	OLS	OLS	2 stage design	Standard Tobit methodology	OLS
Dependent variable	Interest rate of firms most recent loan	The loan rate premium over bank prime rate	Interest rate; Interest expense divided by average debt during the year.	Interest rate on loan or overdraft.	Interest margin	Interest cost to total debt / Interest cost to total assets
Size	Book value of assets	Total firm assets	Log of one plus total assets.		Project sales	Net sales of the firm.
Profitability	Gross profit to assets/Standard deviation of gross profit to assets	Pretax profit as a % of sales				Ratio of net return to net sales.
Age	No of years since the	Number of years the	Number of years that			Age of the firm in

	firm was founded/ No. of years under current ownership	current owner have the business	have elapsed since the firm's IPO			years.
Collateral /Assets structure	Not reported	Dummy variable =1 if the loan is secured	Total property , plant and equipment scaled by total assets.	Collall=Land , guarantee, life policy, equity/CLBI =Collall-equity denominated in £1000s CEI=Owners equity denominated in £1000s	Total collateralisible wealth	Ratio of tangible assets to total assets.
Gearing	Debt to assets	Total debt to total assets	Book value of total debt deflated by firm market value			
Liquidity		Current assets to current liabilities and Current assets minus inventory over current liabilities. Accounts receivable turnover, inventory turnover, Accounts payable				

		turnover.				
Negative equity			Dummy variable to identify when the book value of equity is negative.			
Sales Growth	(Sales-sales(-1))/Sales					Percentage sales growth during t-1
Creditworthiness						Credit score rating
Cash flow			Cash flow from operations scaled by total assets.			
Dummy(SME)						SME = 1 if the firm is a SME, otherwise 0
Year			Calendar year in which the firm had its initial public offering.			
Default on payment			The difference between the yield on BAA-rated corporate bonds and the yield on 10 year			No of unsettled payments.

			government bonds for the year.			
Length of the relationship	No. of years since the firm started operations with the bank.	Length of the relationship with current lender in years				
Amount borrowed					Amount borrowed	
Auditor choice			This variable has value of 1 when the firm retain a Big Six auditor; 0 otherwise.			=1 if the firm's auditor has issued an auditing note before approving of the firm's financial statements. =0 otherwise
Quality of the enterprise	No. of banks/ Fraction of firm debt that is borrowed from its current lender.					
Finance/purpose				Dummy =1 if first round finance and 0 otherwise.	Dummy 1=working capital loan. Otherwise 0	

Industry	Seven industry dummies based on one digit SIC codes.	Three dummy variables for construction, service and retail.	Firms one digit SIC code.			
Dummy	Three regional dummies and six dummies for type of asset with which the loan is collateralized. Characteristic of loan rate.	Ten other dummy variables to represent contract and governance characteristic.	Big Six; 1 when the firm retains a Big Six auditor and 0 otherwise.	Business overdraft coded as 1 for 'yes' otherwise 0		

Variable	**Sengupta(1998)**	**Hooks(2003)**	**Holmes et al (1994)**	**Rand(2007)**	**Niskanen and Niskanen (2010)**
Sample, period and no. of observation.	Sample obtained from the 1987-1991 annual volume of FAF reports. Use a sample of 103 different firms.	Small, medium and large in 1991 and 1992. Use a sample of 265 firms.	A random sample of 425 firms was selected from 1989 Australian telecom yellow pages.	Survey data for 2000-2001 for over 1600 Vietnamese manufacturing firms from 4 provinces.	2672 observations of small and medium size companies in Finland for the period 1994-1997.
Method	OLS	Tobit	ANOVA test, Scheffe test	Probit	OLS

Dependent variable	Yield to maturity on first debt issued in year t+1/Total interest cost of the first debt issued in year t+1	Bank debt concentration. Bank debt to total liabilities.	Interest rate for over draft, term loan	Interest rate	Interest rate spread on each firms bank loan
Size	Log of book value of total assets.	Total assets	Turnover	Total Assets	Log of Total Assets
Issuer size	Log of the dollar amount of the debt issued.				
Profitability	Income before extraordinary items of year t divided by the net sales of year t.	Income divided by the total assets.		Not reported	Income over total assets.
Age		No. of years since founding	Age of the firm in years.	No. of years since founding	Age of the firm in years.
Collateral		Tangible assets to total assets.		Not reported	Dummy variable
Gearing	Total liabilities at the end of year t divided by the market value of common equity at the end of year t.	Total debt divided by total assets.			Debt over assets
Size of the loan(Loan amount)				Not reported	
Convert	Dummy =1 if debt is convertible, 0				

	otherwise.				
Subordinated debt	Dummy =1 if debt is subordinated, 0 otherwise.				
Business cycle	Average yield on Moody's AAA bonds for the month of issue minus the average yield on 30 years US TB for the month of issue.				
Treasury Bill	Yield on US treasury bond.				
Interest ratio	Income before extraordinary item and interest of year t divided by the interest of year t.				
Reputation		Research and development to total sales.			
STD of return	Standard deviation of daily stock returns over year t.				
Sales growth and sales		Annual net sales growth		Not reported	
Management ownership					Percentage of managerial ownership
Maturity	Log of no of				

period	years to maturity.				
Call	Number of years to first call to divided by no of years to maturity.				
Relationship				Not reported	Number of lending banks/ Number of banks in country.
Location of the firm					Dummy variable 1= If the firm located in urban area and 0 otherwise.
Disclosure	Average of total FAF disclosure score over the years t, t-1, t-2.				

Financial economics literature confirms quite well the negative relation between the cost of debt capital and firm age of large companies. However there are few studies that focus on importance of age. Petersen and Rajan (1994) find that effect from firm age onto cost of debt capital is a negative correlation and they widely find that such a correlation may simply be due to the unobservable heterogeneity in firm quality. For instance young firm may be more prone to default than mature firms' quality such as firm size, amount of tangible assets and industry constant. To control for the variation in the loan rate due to characteristics of the firm they include the size (book value of assets), leverage, dummies for the firms industry and whether the firm is incorporated. The coefficient reported for the firm characteristics are

consistent with these variables being proxies for risk. Larger firms pay lower interest rates. Collateral shows a negative correlation with the rate of interest and the importance of collateralizible assets in small firm lending is considered by Henley and Crook (2005) and found the same relationship.

To control for the variation in the loan rate due to the characteristics of the loan they include dummies for whether it is a floating rate loan, for the kind of collateral offered and for the type of lender making the loan. They also include regional dummies and industry dummies. Estimate the effect of relationships on the interest rate charged. The first dimension of a relationship that they include is the length of the relationship of borrower with the current lender which is a proxy for the private information the lender has about the borrower. They found that firms who have short term relationship with the lender should pay a higher rate. The other measure they examine is the non-borrowing side of the firm's relationship with the lender. In addition to the borrowing the firm may have checking or saving deposit with its current lender. The third measure of the strength of the relationship is how concentrated the firm's borrowing is. This is associated with lower credit cost, improve lenders control and cement the relationship. Keeping contacts with one bank reduce the asymmetry of information, reduce the monitoring cost so finally it leads to lower the cost of credit. They conclude that borrow from multiple banks are charged a significantly higher rate as multiple sourcing weaken the relationships[39].

[39] Being the sole lender to the borrower improves lenders ability to control the borrower's action to ensure that the project is success.

Using cross sectional Ordinary Least Squares (OLS) regression for a sample of small privately held firms Petersen and Rajan (1994) are among the first to examine empirically how bank firm relationship affect the availability of credit and cost of credit. The data comes from 1988 National Survey of Small Business Finance conducted by US Small Business Administration and the Federal Reserve.

Berger and Udell (1995) use the same dataset as Petersen and Rajan(1994) and find that borrowers with longer banking relationships pay lower interest rate and are less likely to pledge collateral. These results are consistent with theoretical arguments (Diamond,1991) that relationship lending generates valuable information about borrower quality.

They have found interesting results for the size of the firm. The total sample which represents approximately 90% less than 100 employees and only 10% had 100-500[40.] OLS regression for premium shows a positive relationship with the firm size variable. This may be due to the composition of the sample. Then they regress the firms with total assets above $500,000 and found a negative correlation with the firm size which is consistent with the previous studies (Petersen and Rajan, 1994). For firms with assets above $500,000 are somewhat stronger than the findings for all firms. The Age and Relationship coefficients and t –statistics are larger, R2 s are higher. Further dummy (Loan is secured by accounts receivable and/ or inventory) for collateral is marginally statistically significant only for the firms with total assets above $500,000. This suggests that firms with total assets above $500,000 being secured by accounts receivable and/or inventory may be in important indicator of higher loan risk.

[40] According to the US definition 90% is small firms and only 10% is medium firms.

In contrast to the stronger results for firms with total assets above $500,000, the regression for the firms with assets below $500,000 shows much greater weaknesses. Only one independent variable (Dummy which represents the retail industry) is statistically significant and R2 s is about half of those for firms with assets above $500,000. This suggests that the pricing of bank loans to very small firms is relatively idiosyncratic and further Berger and Udell (1995) point out the reason may be that the reputation and financial accounts of the business and owners of small family owned businesses are not economically separable. Lack of personal data on the owner which can be used by the bank such as credit history and how long the firms have had the personal relationship with the bank, affects the explanation why there is fairly low R2 and most of the control variables are insignificant.

Overall the results of the loan rate tests suggest that the lender-borrower relationship plays an important role in determining the interest rate but, this is not relevant to the very small firms. The result of this study is consistent with the theoretical model of Petersen and Rajan(1994) which shows a negative association between loan rates and the length of the relationship but, loan rate test results differ from those of Petersen and Rajan(1994) who use the same data set because this study focus on lines of credit[41].

Sengupta (1998) use data on 532 US firms that have total disclosure score from1987-1991 annual volumes of the FAF[42] reports. This paper investigates the link between a firm's overall

[41] This study include only Lines of Credit(L/C) loans and exclude transaction-driven loans such as mortgages, equipment loans, motor vehicle loans and other spot loans.

[42] A measure of a firm's overall disclosure quality is obtained from the annual volumes of the Report of the Financial Analysts Federation Corporation Information Committee (FAF 1987-1991). Published by Financial Analysts Federation (FAF) branch of the Association for Investment Management and Research (AIMR), each

disclosure quality and its cost of debt financing. Two alternatives measures of the cost of the debt of the firm are considered here. (i) Yield to maturity on new debt issues and (ii) the total interest cost of new debt issues and showed that both measures are negatively associated with the disclosure measure, after controlling for the potential determinants of firm's cost of debt.

This study extends the investigation of the consequences of disclosure quality by providing evidence of a link between disclosure quality and the cost of debt capital. He found that lenders and underwriters[43] consider a firm's disclosure quality in their default risk estimates. Other things remain constant the firms that are rated favorably by financial analysts for the degree of detail, timeliness and clarity of disclosures are perceived to have a lower default risk and are rewarded with lower cost of borrowing. Sengupta(1998) provides the evidence that firms with high disclosure quality ratings from financial analysts enjoy a lower effective interest cost of issuing debt. Consistent with the argument that a policy of timely and detailed disclosure reduces lenders and underwriters perception of default risk for the disclosing firm reducing its cost of debt.

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annual volume provides summary evaluations of disclosure practices for sample firms, based on their aggregate disclosure efforts over a fiscal year. Firms are evaluated on their disclosures through annual reports, quarterly reports, proxy statements, other published information such as press release and fact books, and direct disclosures to the analysts in the form of meetings and response to analyst inquiries. Analyst evaluate the timeliness, detail and clarity of information presented and based on the evaluation each firm is typically assigned a score out of 100 possible points and separate scores for different disclosure categories.

[43] A company or other entity that administers the public issuance and distribution of securities from a corporation or other issuing body. An underwriter works closely with the issuing body to determine the offering price of the securities, buys them from the issuer and sells them to investors via the underwriter's distribution network.

Pittman and Fortin (2004) examine the link between auditor choice and debt pricing for newly public firms. They argue and proved that as lenders perceive that riskier borrowers must provide security for their loans interest rates are increasing in collateral which is consistent with the perception in the banking industry. They also predict and shown that interest rates will be increasing in leverage which is defined as total short-term and long-term debt scaled by firm market value (Petersen and Rajan,1994). The control for profitability is cash flow from operation (Petersen and Rajan,1994) which is predicted and show a negative coefficient since firms that can generate more cash internally are in a better position to service their debts. The negative and statistically significant coefficient for age variable support (Diamond'1989) theory that firms' interest rate will reduce over time. Firm size shows a positive correlation with the interest rate although it is expected to have an inverse relationship between interest rate and firm size.

The negative and statistically significant coefficient on Big Six auditor[44] variable imply that relying on high quality auditor reduces the firms cost of debt. Their evidence suggest that retaining a Big Six auditor, which can reduce debt monitoring costs by enhancing the credibility of financial statement, enables young firms to lower their borrowing costs. Consistent with Stiglitz and Weiss (1981) they argue that information problems are responsible for the severe credit rationing that firms' encounter in the early years.

[44] The Big Six auditor are the six largest international accountancy and professional services firms, which handle the vast majority of audits for publicly traded companies as well as many private companies, creating an oligopoly in auditing large companies. The Big Four firms are shown below, with their latest publicly available data.

Hooks (2003) use a sample of US firms to examine the determinants of the concentration of bank debt in total debt. He studies the determinants of bank concentration by firm size. He argues that a firm that is small typically is more difficult for outsiders to observe because of little public information is produced about the firm and the firm has no outside reputation and he found that smaller the firm lower the concentration on bank debt which is consistent with Diamond (1991). The coefficient for tangible assets ratio is significant and negative which suggest that firms with low observarbility are more likely to use bank debt than other firms. But this relationship is statistically important only for large and medium firms. This difference may arise because the model allows the coefficient to change over firm size. Income is negatively related to the bank debt concentration for all sizes while sales growth is negatively related only for medium and large firms. Further this study suggests that small and medium sized firms face difficulties obtaining bank loans as they are difficult to observe which is supported by the negative coefficient of R&D.

Burke and Hanley (2006) investigate the relationship between bank interest rate margin and collateral for loans issued to new ventures. They find a convex U shaped relationship indicating that collateral initially reduces the bank exposure to risk that beyond a point, the positive risk wealth association gives rise to greater risk taking propensity among entrepreneurs and ultimately higher interest rates[45].

They find that initially the provision of collateral enable new venture to get cheaper credit and by providing bank with more security. However, even greater subsequent amount of collateral

[45] See Burke and Hanley(2006) pg.324-327

which can be provided by wealthier firms can induce moral hazard through reduce entrepreneurial effort, more risk loving behavior or a combination of both. To compensate for this greater risk lenders charge higher interest. Larger enterprises in terms of projected sales turnover possibly pose lower risk and pay lower interest rate. Ability of the lender to ascertain the borrowers real revealed quality is positive and significant. Explanation for this is that higher the deterioration of credit quality would be charged a higher interest. Quality of the enterprise is a proxy for risk status which observes the borrower's credit quality through the credit rating and decides the interest rate margin. Specifically it is noted that firms with deterioration in credit may have to pay higher interest which is based on the idea that higher the risk higher the cost of debt.

Hyytinen and Pajarinen (2007) found that for the small firms, the effect of getting older on the cost of debt finance is economically large. Interest cost is defined as the financial expenses which consist of interest and other financial expenses and foreign currency losses. They have used two versions of dependent variable. The first is defined as the ratio of interest cost to total debt and the second is the ratio of interest costs to total assets. The main explanatory variable is the age of the firm in years and another important variable is the creditworthiness measured using the credit score rating. However, credit score rating is also a proxy for the risk. This gives the lender a fast objective measure of credit risk. Other control variables include sales which measures the size of the firm. By incorporating dummy variable for SME this study tries to compare the cost of debt capital of small firms and large firms. In addition to that there are 5 other control variables such as profit, audit, auditor, default and sales growth.

As shown in Table 4.1 the results in Hyytinen and Pajarinen (2007) confirm the expectations. In particular the estimated coefficient for the main variable, age is negatively signed and significant. They also find that cost of debt capital is higher for young firms even after changes in observable creditworthiness are controlled. The findings about the age of the firm is consistent with the age effect document in Petersen and Rajan(1994)[46] and suggests that the return to maturing one more year is not negligible in the market for small business debt finance. The estimated coefficient for the tangibles suggest that within-firm growth of collateralizible wealth is not what drives the negative relation. This is consistent with Pittman and Fortin(2004). Further they conclude that their results are consistent with the view that the lender-borrower conflict is empirically relevant and that the return to aging, which for various reasons alleviate the conflict, is not negligible in the market for small firm debt finance. This finding imply that if the high cost of debt to young firms are driven by the informational problems, such as adverse selection or moral hazard.

Further, Berger and Udell (2002) note that the issue of credit availability to small firms has earned worldwide concern recently. Small firms are also vulnerable because of their dependence on financial institutions for external funding, as these firms do not have access to public capital markets. Moreover theoretical analysis of credit rationing suggest that small firms may be particularly vulnerable because they are often so informational incomprehensible. In other words, the informational asymmetry insiders and outsiders tend to be more sensitive for small companies, making the more costly the external financing. As a result small firms with attractive investment opportunities may face funding issues.

[46] As pointed out by Petersen and Rajan (1994) an additional year reduces the interest rate by 1.4 basis points and found some evidence for declining age effect.

In practice there is a considerable variation in the use of debt capital. In particular some SMEs do not use any debt at all and very few use external equity or long term debt (Wilson,1980). This reflects the shortcomings of the SME owner/manager on the demand side and, or deficiencies on the part of financial institutions and capital market on the supply side. Further Wilson (1980) explains small companies have particular difficulties in undertaking high-risk projects. By definition such projects are likely to be large in relation to the size of the firm, and the resources available in terms of finance and management is limited. A small firm is commonly unwilling to enter in to a joint venture because of reluctance on losing the controlling power. A further set of difficulties[47] is involved where the firm concerned is not only small, but also new[48.]

Holmes et al (1994) study the cost of debt for small and large firms in Australia by collecting the information on the cost of debt for firms operating in retail, wholesale, manufacturing and service sectors. Further they focused on the relative cost of the loan application for small firms compared to large firms. Average interest by size and age failed to indicate any statistically significant differences in the average interest rate charged for trading (commercial) bank overdraft. For trading(commercial) bank term loan shows a significant difference in average interest rate for small firms(18.34) when compared to medium(16.70) and large (15.65) firms. However observed differences indicate that micro-small older firms

[47] One other main problem that SMEs face is the collateral. Perhaps the most frequently used collateral by SMEs is the owners own house. Differences in the estimation of valuation of asset between bank and borrower occur (See Storey 1994).

[48] Experience in many countries suggests that setting up new enterprises is not only always the best way of undertaking high risk projects. A better approach could be for innovators to try to persuade an established company to take up and develop their idea. Then the chance of failing the project is lower as management expertise and financial back is there. In this way, if it fails, the cost can be offset against profits earned elsewhere in the enterprise and the burden thereby effectively share with the tax payers.

pay lower average interest rates than micro-small firms less than 10 years old. Scheffe[49] test indicates a significant difference in the average cost of lease for micro-small (18.54) and small firms (18.49) compared to large firms (15.03). For finance company lease and other sources of funds no significant differences in average interest rates across the four categories were reported.

Supporting the argument of Titman and Wessels (1988) that information asymmetry and transaction cost influence the cost of debt Holmes et al (1994) shows a significant difference exists between application costs incurred by micro-small and small firms as compared to medium and large firms.

Titman and Wessels (1988) support the idea that information asymmetry and transaction costs influence then firm's choice of funds. Further they found that smaller firms use more short term debt than larger firms and implied a significantly negative estimated coefficient on the size variable and the short-term debt. Again this suggests the higher degree of information asymmetries and higher transaction costs that small firms face when issuing long-term debt or equity. Clearly this shows higher the information asymmetry and transaction cost greater the cost of debt capital. In addition they found that profitable firms with sufficient internal funds tend to have less debt or equity relative to the market value of their equity which indicate by the negatively significant coefficient on the profitability.

[49] Scheffe test is a parametric multi-comparison procedure which tests the hypotheses that the means of each pair of waves are equal.

Tagoe et al (2005) studies the financial challenges of Ghana SMEs and aimed to indentify the finance sector liberalization on the financing of SMEs. The findings imply that SME investor relations, skills, record keeping and provision of collateral improve SME access to formal credit. This study further showed that good information management and the ability to use information to present a well- crafted business for financing reduces the risk perception and increases the chance of SMEs getting adequate funds.

Economic theory predicts that the worse the informational asymmetry is the higher is the cost of external finance. The amount of information available about a firm increases the longer it has been in the business. Accumulation of information reduces the adverse selection and the cost of external finance. Diamond (1991) has shown that a firm which has not yet established a reputation and therefore has a low credit rating, attempts to borrow from a bank. Diamond and Verrecchia (1991) investigate that disclosure, liquidity and cost of capital and provide a framework to analyze effects of changes in information asymmetry on security pricing, while providing cross-sectional predictions about differences in sensitivity of security prices to information asymmetry. Generally this is by examining the effects of corporate disclosures that reduce information asymmetry. Further, policies that reduce the information asymmetry will increase the liquidity of the market for a firm's securities, which induces the larger traders who anticipate making future large trade increases the competition with the market makers and reduce the volatility of future order imbalances and leading to exit market makers. For smaller firms the cost of capital is high as they disclose less.

Niskanen and Niskanen (2010) investigate the impact of managerial ownership on loan availability and credit terms for SMEs in Finnish. They find that increase in managerial

ownership decrease the loan availability. This means that managerial ownership potentially creates conflicts of interest between managers and bond holders. This would ultimately increase the collateral requirement and cost of debt due to the higher risk. Consistent with Petersen and Rajan (1994) this study find that firms with close relationships with financial institutions have a lower cost of capital ,better access to credit, the existence of a relationship lowers the cost of credit and borrowing from multiple banks increases the cost and collateral requirement and reduce the availability of credit. This suggests that SMEs could benefit from a closer relationship with their banks.

The results for the firm specific variables suggest that bigger and more profitable firms pays lower interest rates consistent with other studies (Petersen and Rajan,1994; Sengupta,1998; Hooks,2003; Pittman and Fortin,2004;Hyytinen and Pajarinen,2007). Firm age can be seen as a proxy for the private information the lender has about the borrower and it improve availability of loan and reduce the collateral requirement plus cost of debt. Dummy variable which represent the collateral suggest that firms which are required to put up collateral also pay interest. This is inconsistent with the predicted negative relationship which is based on the idea that level of collateral is negatively related the risk level of the investment project. Niskanen and Niskanen (2010) try to reconcile the positive relationship with interest rate by suggesting that the usage of collateral is positively associated with the risk involved. This is consistent with Pittman and Fortin (2004). Specifically it is noted that the perception in the banking industry that riskier borrowers must provide security for their loans. In addition to that this can be interpreted as a result of using number of lending banks where the increase in the number of lending banks increases the likelihood of collateral requirement. Consistent

with the prediction the location of the firm shows that rural firms have easy access to funds than firms situated in urban locations.

Thus age of the firm, debt to assets, relationship lending and managerial ownership do not seem to have an impact on the loan interest rate of Finnish firms for the period of 1994-1997. Overall, this study suggests that when lending to SMEs bank consider agency cost involved with the managerial ownership. Further it suggests that dispersed ownership reduce the agency cost, stronger the capital structure and more capacity raise additional capital. However, the Finnish capital market circumstance evident that banks are the only source of external finance for SME. This point regarding the source of finance is also confirmed by Petersen and Rajan (1994) that they note that firms diversify their sources as they become larger and less clear that age has any effect on diversification. In general results of Niskanen and Niskanen (2010) appear to support asymmetric information, adverse selection and moral hazard which may have a sizeable effect when firms are young or small that explain why they find it hard to raise money in the public markets. However through close and long term contacts with the lender, firm would provide the lender sufficient information so as to lower the cost and increase the availability of credit.

Financial structure of a corporation provides the market with information about the firm with the market value of the firm increasing with the level of debt (Ross, 1977). This can be taken to mean that, if managers raise the level of debt, then it is for the reason that their expectations for the future of the company permit it to meet its obligations.

According to Berger and Udell (2002) one of the most powerful mechanisms for ensuring that small firms can get an adequate supply of credit is relationship lending. They explain the key relationship is not the relationship between the bank and the firm, but rather the relationship between the loan offer and the firm's owner.[50] Further they explain what is this relationship that lender has to have soft data such as information about character, its local community and reliability of the firm's owner, which may be difficult to quantify through the normal channels of banking operations. This has an important implication for the consolidation of the financial institutions. Berger and Udell (2002) suggest that this is not practical and has negative impact on relationship lending as it is difficult to transmit the soft data of the borrower through the formal management layer in large lending institutions. Further consolidation would badly affect the small businesses funding gap due to the lost banking relationship. This would lead to adverse selection and moral hazard problem. For instance, this would ultimately affect small firms with investment opportunities to face to a funding gap as the potential finance providers cannot rightly confirm that firm has access to quality projects or/and funds will not be used to an alternative project. Hence, changes in banking system would significantly impact on the SME as they highly depend on the financial institutions for external finance as they do not have access to public capital market. Berger and Udell (2002) develop a model to emphasize that the banking relationship is not the relationship between bank and the borrower but the relationship with the loan officer and the owner of the firm.

[50] Except for the smallest loans, banks have to secure their position by evaluating borrowers' credit worthiness. This is one of the credit analysis criteria which is called character(five Cs of credit analysis, character, capacity, capital, collateral and coverage of potential borrowers; Tirole(1996)).For many bankers, character determines if a small business loan will be approved at all. The problems involved in dealing with the characters are non-corporation with the bank, fraud, litigation and write-off are a significant limits. These factors are however less important with large firms as they are managed by a team of individuals.

Omran and Pointon (2004) study the determinants of cost of capital by industry within an emerging market in particular the Egypt. Based on sample of 119 companies the analysis is undertaken. To achieve the objective of this study cost of capital is split in to component cost for equity and debt. They found that different industries are affected to different cyclical[51] variations. For example, in prosperous time the property sector may outperform other sectors, yet may be less insulated when the economic climate changes unfavorably. However, it can be argued that the on account of political and economic situation in Egypt, investors might ask for a higher return because they will bear more risk compared with other countries.

Rand (2007) examines the extent to which borrowing constraint restrict from access to credit and identifies individual, firm and loan characteristics which determine the cost of capital in Vietnamese manufacturing. He notes that only 14 and 25% of these enterprises are credit constrained and these enterprises would increase their holding by between 40 and 115% if borrowing constraint were relaxed. Moreover it emerges that informal credit market play an important role for fast growing firms. Thus he analyzed firms, which get access to credit, and examined the empirical determinants of credit availability and the interest rate on the most recent loan. The analysis demonstrated that 35% receive credit from informal sources, larger firms get cheaper credit, Informal credit markets play an important role for fast growing firms, probability of accessing credit is higher in rural area, demand for external funds is significantly higher in rural areas than the larger urban areas.

[51] SME who rely more on banks, are more affected than larger firms by business cycle-related fluctuations(See Gertler and Gilchrist, 1994)

This study found that government bank charge significantly higher interest on collateralized loans indicating that government bank may use other different criteria to determine the interest rate. Private banks are charged significantly low interest rate from larger loan amounts and loans based on collateral. Age is negatively related with interest rate but it shows that age does not plays a significant role as a determinant of cost of debt for Vietnamese Manufacturing firms which is contrary to the findings in Petersen and Rajan (1994). Firms' reputation measured by the age of the firm therefore does not seem to influence the interest rate of Vietnamese SMEs.

Undoubtedly, this is wide support for the notion that cost of debt for small enterprises is higher than for other enterprises. The above review explains why the cost of debt for small business is higher than for other firms. It is result of specific characteristics of small enterprises. First of all, the small enterprises are more risky than other firms. Next, in small enterprises agency costs and information asymmetry are different than in other firms. All of them cause the growing of the cost of debt for small enterprises.

To contribute to the cost of debt of SME's debate, this study draws from the key findings and procedures of previous work. In particular, the explanatory variables, their measurements, and predictions regarding relationships with the dependent variable, are based on the studies reviewed above.

4.4 Model of cost of debt

4.4.1 Theoretical predictions

As per the review in the previous section impact of the main explanatory variables on the cost of debt are based on the trade off theory, agency theory, and theory of credit rationing, theory of asymmetric information plus empirical studies. In an attempt to contribute to the determinants of cost of debt capital of SMEs in the UK, the findings and procedures of previous work is vital and the summery of the perdition is given as follows.

4.4.2 The dependent variable.

4.4.2.1 Cost of debt.

The dependent variable is the interest cost on the firm's debt, which is calculated as its interest expense for the year divided by its average short-term and long-term debt during the year. This includes the risk free rate plus the risk premium. The reported cost of debt consists of interest paid to banks, paid on hire purchase, paid on leasing and other interest paid.

In this study we measure the dependent variable (COD)[52] as interest cost over total debt. Total debt represent short term debt and long term debt for the period of which the interest cost accrue. However, we trim the data[53] to address extreme observations, and then we discard the firms' year observation outside the 5th and 95th percentile.

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[52] See Appendix 4A

[53] In the dataset (raw dataset) 16.83% firms had no debt and 37.75% had no interest reported. In here it is important to note why some firms have no debt. This could be that the vast majority (39%) of the firms in this dataset is micro firms and they may not demand for debt. It could be that they do not need any debt or even they had a need, on the other hand some firms may reluctant to use debt if the cost of the debt is very high and not very profitable to employee debt capital.

4.4.3 Explanatory Variables

4.4.3.1 Firm Age

Diamond's (1989, 1991) theory of reputation formation in debt markets predicts that interest rates will decline over time as firms' compile good credit histories. Older firms might have established a reputation, resulting in lower levels of asymmetric information. Smaller firms, due to economies of scale in information production and distribution, might produce less information about themselves thus having higher formation of asymmetry (Pettit and Singer, 1985). As there is only limited information available on young firms, lenders depend largely on firms disclosures to evaluate their performance and future prospects (Sengupta, 1998). Lenders would have conduct costly information production and monitoring using alternative sources in the absence of proper information for the relatively small firms. We expect that firms with greater level of asymmetric information (younger or smaller firms) will use less debt at higher cost. So the age will be negatively related to the cost of debt[54]. The existence of asymmetric information for smaller firms makes the bank more wary of lending to this type of firm on the ground of greater uncertainty. This causes them to charge higher interest on lending. However, as the business mature asymmetry of information will increasingly favour the business (Storey, 1994). In addition, it is argued that the greater availability of information on older firms decreases information asymmetries associated with equity. Thus, mature firms should tend to use capital market for equity relatively more, than younger firms. Further, it can be argued that older firms are likely to have higher accumulated retained profit so these firms need not to depend more on external debt finance. We measure firm age as the number

[54] Higher the age lowers the risk where by lowering asymmetry of information.

of years that have elapsed between their incorporation date and the year of concern for the study.

4.4.3.2 Size

The size of the firm allow lenders to calculate its market power and therefore, to indirectly estimate its insolvency risk. The bigger the volume of assets, the profits, the sales or the number of employees, the greater the self financing capacity, and the probability that the activities tend to be more diversified[55] and, as a result, less risky and less prone to bankruptcy. In line with trade off theory these firms therefore have negative link with the cost of debt and size. The size is related to the other group of variables that determine the capital structure of the enterprise. Many studies suggested that there is a positive relationship between leverage and size. Large firms more often choose long-term debt, while small firms choose short-term debt (Marsh, 1982)[56]. Large firms may be taking the advantage of economies of scale[57] (Berger and Udell ,2006) in issuing long-term debt and may even have bargaining power over

[55] Diversification is generally associated with less risk as the larger portfolio will always assumed to be reduced return volatility compared with smaller portfolios. Larger the firm have better opportunities for diversification both domestically and internationally and can have properties in greater variety of lot sizes than smaller firms and therefore large firms have a greater potential to diversify, reduce return volatility and thereby reduce risk.

[56] Using a sample of UK quoted companies between 1959 and 1970 (Marsh, 1982) conclude that long-term debt ratio, and the ratio of short-term to total debt are functions of company size, bankruptcy risk and asset composition.

[57] Economies of scale arise when the cost per unit falls as output increases. Large business can pass on lower costs to customers through lower prices and increase its share of market which poses a threat to smaller firms. Many small firms find it harder to obtain finance (especially long term furnace) even they obtain it, the cost of the finance is often quite high. As small firms are perceived being riskier than large firms and this make easier to find potential lenders and to raise money at lower interest rates for large firms. This is because of asymmetry of information. Berger and Udell(1995) point out that existence of financial intermediaries are the best evidence that the economies of scale on information are possible. This means that average cost of information decreases as the amount of intermediated resources is augmented, which normally occurs when the size of the entity grows. In particular according to Berger and Udell (2006) large firms may be able to take the advantage of economies of scale in the processing of hard information.

creditors[58]. In addition, larger firms are often diversified and have more stable cash flows, and so the probability of bankruptcy for larger firms is less relative to the smaller firms. This suggests that the size could be negatively related to the cost of debt. This negative relationship of size and leverage is also viewed as support for the asymmetric information (Myers and Mailuf, 1984). Small size is likely to have severe information asymmetries and SMEs are unlikely to have adequate and reliable financial statements (Doanh and Pentley, 1999). This means SMEs generally face more difficulties in accessing loans from financial institutions. Hence, this suggests that the cost of debt is negatively related to the size of the firm. We measure the size in two different ways, natural logarithms of total sales and total assets.

4.4.3.3 Collateral Assets

Collateral requirement is a powerful tool that allows financial institutions to offer credit on favorable terms to SMEs whose informational asymmetry otherwise can result in either credit rationing or extension of credit on relatively unfavorable terms. Boot et al (1991) suggest that firms with potential collateral are likely to fund through bank loans. They suggested that collateral can be used as a signal of borrowers. As firm has more information about the probability of success, providing collateral is seemed to be a positive signal to the lender. In addition Berger and Udell (1995) argue that some banks specialize in lending to the firms with substantial asymmetric information problems. These can be reflected in the nature of loan contract terms such as rate of interest and collateral. Edwards and Fischer (1994) state that collateral seems to be one of the requirement for the majority of bank loans in Germany and UK. Berger and Udell (1990) report that collateral is an important feature of more than

[58] Further, Rand (2007) argued that larger firms can borrow at better terms as they have better information and good reputation.

70% of all commercial and industrial loans made in the U.S. There is considerable prior evidence that interest rates are increasing in collateral (e.g., Scott and Smith, 1986; and Blackwell et al., 1998), which is consistent with the idea that in the banking industry risky borrowers must provide security for their loans (Morsman, 1986 and Hempel et al., 1986). Burke and Hanley (2003) focus on the relationship between collateral and risk aversion. They show that for any given level of wealth, higher collateral induces borrowers to be more risk averse hence raising banks expected profit for any given interest margin. This implies that the coefficient on the control for asset structure, which is the fraction of total assets in property, plant, and equipment, will be negative.

4.4.3.4 Profitability

In an agency theory framework, if the market for corporate control is inefficient, managers of profitable firms will use the higher level of retained earnings in order to avoid the disciplinary role of external finance. This prediction is consistent with Petersen and Rajan(1994), Sengupta(1998), Hooks(2003), Pittman and Fortin(2004), Hyytinen and Pajarinen(2007), and Niskanen and Niskanen (2010). So the expected correlation between profitability and cost of debt is negative.

4.4.3.5 Gearing

Positive association between gearing and cost of debt is found in the previous studies (Rajan(1994), Udell(1995), Fortin(2004)) and this reflect the fact that higher the leverage greater the risk. Therefore, a positive relationship between bank debt ratio and the leverage is expected. Considerations based on trade off theory is also support a positive relationship between cost of debt and gearing. For instance, highly levered firms face a higher cost of

financial distress which can lead to bankruptcy and that will increase the risk. If the company is perceived as being risky, for whatever reason, lenders are likely to demand higher returns to compensate for the risks involved, where a very high rate of interest is demanded. Hooks and Opler (1993) find that bank borrowing is highest among firms employing relatively little debt in their capital structure. There is a positive relationship between gearing and cost of debt to reflect the capital perspective of financial risk[59].

4.4.3.6 Liquidity

High liquidity indicates the inefficient use of funds and the low liquidity limit profitable investment. On the other hand higher liquidity lowers the bankruptcy risk, and lower the liquidity higher the bankruptcy cost despite of having more wealth in the form of assets. So it is debatable and the correlation between cost of debt and liquidity could be negative or positive. The current assets to current liabilities represent the liquidity level in our model.

4.4.3.7 Sales Growth

In line with agency theory growth in sales means the efficiency of management which implies the lower the business risk as this is a good indication that firm has adequate cash to meet its operating expenses. Therefore sales growth has a negative correlation with cost of debt. This is consistent with Hyytinen and Pajarinen (2007) and Ahmed et al.(2002). Sales growth is measured as annual percentage change in firm's sales.

[59] See Chang and Rhee, 1990.

4.4.3.8 Creditworthiness

This measures the individual companies' ability to meet the debt obligations. When lenders choose to extend credit to an individual or business, that extension of credit is based on the understanding that the borrower will have resources that can be used to repay the debt. Risk measure runs from 0 (high risk) to 100(highly secure). QUI[60] score is used to measure the creditworthiness[61]. This is a 0, 1 dummy variable which is defined as if credit score is between 0-50 equal 0 and otherwise 1. The expected relationship with cost of debt is negative (Hyytinen and Pajarinen,2007).

4.4.3.9 Audit Dummy

This dummy is created to measure the riskiness of the firm. This variable is intended to proxy for credit risk, with observably riskier borrower predicted to pay higher interest rates. If the firm's auditor has issued an unqualified audit report equal 1 otherwise (qualified) equal to 0 (Hyytinen and Pajarinen(2007). This prediction is consistent with Pittman and Fortin(2004) and (Hyytinen and Pajarinen(2007). The relationship between audit dummy and cost of debt we expect as negative.

Table 4.2 shows the expected coefficients of the explanatory variables.

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[60] Developed by CRIF decision solutions limited by taking in to account;

-Adverse documents appearing against company on the public file and timeliness of getting account filed.

-Underlying economic condition

-Financial performance of the company as evident in their balance sheet and profit and loss account.

-In determining score number of separate calculations are performed using various combinations of the key financial items such as turnover, PBT, working capital, intangibles, cash and bank deposits, creditors, bank loans and over draft, current assets, current liabilities, net assets, fixed assets, share capital, reserves and share holders fund.

[61] See the Appendix 4E for more details.

Table 4.2

Expected sign of variables

Variable	Theory/Empirical evidence	Expected sign	Rational
Age	Trade off theory	-	Mature firms suffer less information problems and rely primarily on internal funds thus find less cost of debt. Older firms have access to debt at better terms due to the longer record of proper treatment of creditors.
Size	Trade off theory	-	Larger firms suffer less information asymmetry problems hence find external finance more attractive.
Profit	Trade off theory, Agency Theory	-	Having sufficient retained earnings thus rely less on external funds.
Collateral Assets	Trade off theory	-	Tangible assets can be offered as security to lenders and are likely to have high value on liquidation.
Audit Dummy	Hyytinen and Pajarinen(2007)	-	Qualified or unqualified audit report gives the lender a sign of riskiness of the firm.
Liquidity	Trade off theory	+-	Higher the liquidity shows the inefficient use of funds and lower liquidity limit the profitable investment.
Gearing	Agency Theory	+	Higher the external finance may lead to higher cost of debt capital.
Sales Growth	Agency Theory	-	Growth in sales gives an assurance for the lender.
Creditworthiness	Hyytinen and Pajarinen(2007)	-	Higher the credit score lower the cost of debt.

4.5 Methodology

Since the sample comprises the heterogeneous set of non-financial companies belonging to different sectors of activity, it is reasonable to think that individual firms may have their own characteristics that differentiate them from others. Moreover, their variations across time justify a panel data model as given below. Based on the theories discussed above and reviewed empirical studies of Petersan and Rajan (1994) and Hyytinen and Pajarinen (2007) a model of cost of debt capital is as follows. The panel data model has explained in detail in chapter 3.

$$(COD)_{i,t} = \beta 0+\beta 1\ (AGE)_{i,t} + \beta 2\ (SIZE)_{i,t} + \beta 3\ (PROFIT)_{i,t} + \beta 4\ (GEARING)_{i,t} + \beta 5\ (CA)_{i,t} + \beta 6\ (LIQUIDITY)_{i,t} + \beta 7\ (CREDITSCORE)_{i,t} + \beta 8\ (AUDIT\ DUMMY)_{i,t} + \beta 9\ (SALES\ GROWTH)_{i,t} + \alpha_i + \alpha_t + \varepsilon_{i,t} \quad (4.1)$$

Where variable definitions are as follows. COD is the ratio of interest expenses[62] to total debt; AGE is either the number of years since the year of incorporation or 0, 1 dummy variable[63.] SIZE is either natural log of total assets (SIZE2) or log of turnover; PROFIT is profit before interest and tax as a ratio of total assets; GEARING is the ratio of debt to equity; CA is the ratio of intangible assets to total assets; LIQUIDITY is the ratio of current assets to current liabilities; CREDITSCORE is the QUI Score. AUDIT DUMMY is a 0, 1 dummy variable and

[62] This includes, Interest paid to bank, paid on higher purchase, paid on leasing and other interest paid.

[63] Here we have created a 0, 1 dummy for age where age of the firm is equal or less than 10 equal 0 and 1 otherwise.

SALES GROWTH is the growth in annual sales. εi,t is a disturbance term assumed to satisfy usual regression model condition.

More detailed definition of all variables is enclosed in Appendix 4A.

4.5.1 Endogeneity

It is important to know whether an explanatory variable is endogenous in a specific structural equation because it affects the way in which parameter should be estimated. The econometric form of endogeneity is whether the parameters of interest in the context of the specific structural model are affected by correlation between any explanatory variables and the disturbance term (Maddala, 2001). In this basic model, profit and gearing is endogenous and is likely to be correlated with the disturbance, or error term. Therefore, OLS estimation cannot be performed. In this case the appropriate estimation method is Two Stage Least Square (2SLS).

4.5.2 Two Stage Least Square (2SLS)

We assume that the correlation of some error terms are not 0. Two stages[64] in 2SLS refer to

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[64]Stages in two-stage least squares (2SLS) regression analysis**:** in ordinary least square method, there is a basic assumption that the value of the error terms is independent of predictor variables. When this assumption is broken, two-stage least squares (2SLS) regression analysis helps us to solve this problem. Two-stage least squares (2SLS) regression analysis assumes that there is a secondary predictor that is correlated to the problematic predictor but not with the error term. Given the existence of the instrument variable, two-stage least squares (2SLS) regression analysis uses the following two methods:

1. In the first stage of the two-stage least squares (2SLS) regression analysis, a new variable is created using the instrument variable.
2. In the second stage of the two-stage least squares (2SLS) regression analysis, the model-estimated values from stage one are then used in place of the actual values of the problematic predictors to compute an OLS model for the response of interest.

(1) a stage in which new dependent or endogenous variables are created to substitute for the original ones, and (2) a stage in which the regression is computed in OLS fashion, but using the newly created variables. The purpose of the first stage is to create new dependent variables which do not violate OLS regression's recursivity assumption.

In 2SLS regression analysis, a problematic causal variable is the dependent or endogenous variable whose error term is correlated with the other dependent variable error term. In 2SLS regression analysis, a problematic causal variable is replaced with the substitute variable in the first stage of the 2SLS regression analysis.

4.5.3 Instruments

In two-stage least squares 2SLS regression analysis[65], an instrument variable is used to create a new variable by replacing the problematic variable. This is accomplished using OLS regression, with the problematic causal variable as the dependent and instrumental variables as the independents. The instruments are the exogenous variables with direct or indirect causal paths to the problematic causal variable but which have no direct causal path to the endogenous variable whose disturbance term is correlated with that of the problematic causal variable. The predicted values of this regression equation are the values of the new causal variable which replaces the problematic causal variable.

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[65] See Green, W.H.(1997) pp 740-742 for more detail of 2SLS.

4.5.4 Firm Fixed Effects

There may be unobservable firm specific factors that influence the cost of debt. One way to control for this is to use firm fixed effects. Fixed effects models assume the unobserved variables differ between subjects but are constant across time for the same subject. Conceptually, this is as if you created a dummy variable for every subject to control for subject-specific case effects in a standard multiple regressions. Fixed effects are the most common type of panel data regression model. Note that a set of time dummy variables can be created to run time fixed effects as a way to examine the effects of time periods.

4.6 Data

This section explains the sample selection, and descriptive statistics. We obtain a comprehensive sample to examine the determinants of debt pricing of all active[66] companies which satisfy the definition for SME's in the UK from 1998-2008 from the FAME data base. We employ all active firms from 1998 to 2008 and exclude finance sector from the sample as their financial structure is fundamentally different from that of other firms due to regulation and the financial nature of their operations. In fact, their debt-like liabilities are not strictly comparable to the debt issued by non-financial firms. Further, regulations such as minimum capital requirements may affect their capital structure (Scholes et al, 1990).

[66] Firms which are actively in business operations that survives through the period of study.

4.6.1 Sample Selection and Data

Appendix 4B shows the sample distribution by two digits Standard Industrial Classification (SIC). Total 4072 firms are eliminated from the sample which represents the finance sector. We also dropped 5% of the observations in the upper and lower tail of our dependent variable to limit the effect of very large and very small denominators which would generate unusual ratios, and this lowers the sample again. Finally the selected sample consists of unbalanced panel of 50987 firms[67]. The empirical analysis covers only 10 years in spite of having data for eleven years, due to the definitions of some variables in the model.

4.6.2 Descriptive Statistics

Table 4.3 shows the descriptive statistics (mean, median, standard deviation, minimum and maximum) for all variables over the period 1998-2008. The mean of the COD is 3.9%. The average the AGE of the firm is 10 years and the median PROFIT is 2.45% which indicate moderate profitability. The median of SALESGR is 5.7%[68], which in turn suggest that the firms in our sample are on average growing rapidly. The AUDITDUMMY shows that auditor has issued unqualified audit report on the firm's financial statement for more than 97% firms in the sample. AGEDUMMY shows that more than 50% of companies are older than 10 years.

[67] See Appendix 4D for Number of firms stratified by years.

[68] This may be that one third of firms in the sample are more than 20 years old and approximately 33% are medium firms.

Table 4.3

Descriptive Statistics* of dependent and explanatory variables N=50987

Variable	Mean	Median	Maximum	Minimum	SD	Observations
COD	0.0395	0.0173	0.572	8.46E-06	0.0583	408279
PROFIT	0.0245	0.0489	0.597	-2.712	0.1936	468765
LIQUIDITYRATIO	3.7291	1.32	85.3	0.0194	8.1603	372662
GEARINGRATIO	3.4298	69.76	97.6	0.0352	6.9187	244809
LOGSALES	5.2742	8.8741	17.469	0.0239	3.4123	279667
LOGSIZE	4.5867	5.6148	17.006	1.3298	3.8187	501878
CA	0.2957	0.1969	0.7845	0.7098	1.5498	392896
STD	62.98	67.983	100	2.237	4.4628	407896
AGE	10	7	98	1	7.7695	509857
QUI SCORE	67.5643	77	99	1	21.093	365606
SALESGR	0.273	0.0579	0.969	-0.910	9.6598	212040
AUDITDUMMY	0.97433	1	1	0	0.17983	409359
AGEDUMMY	0.50971	1	1	0	0.43734	509857

*See Appendix 4A and Table 2.3 for definition of variables.

Appendix 4C presents the correlation matrix and there are number of interesting points to note when looking at the matrix. As expected there appears to be high and positive correlation between the alternative firm size proxies. The correlation coefficient between SIZE and SIZE2 is 0.82.

While a high positive correlation among alternative proxies is expected. We can see that both SIZE and SIZE2 (Log Sales and Log Assets) is positively correlated with COD which does not support the conventional insight[69].

When looking at the correlation matrix there is another important point to note that none of the explanatory variables of the equation 4.1 is highly correlated with other.

[69] Expected relationship between size and cost of debt is negative.

4.6 Empirical Procedure

The empirical procedure involves panel data procedure. All the stages will be described consecutively.

Table 4.4

Results for the regression of overall sample

	MODEL 1	**MODEL 2**	**MODEL 3**	**MODEL 4**
Dependant	COD	COD	COD	COD
Adj R squared	.487	.498	.581	.492
Observations	106901	106423	107928	106490
F-statistic	7.742 [.0000]	6.546 [.0000]	7.465 [.0000]	6.537 [.0000]
J Statistic	0.574	0.602	0.482	0.659
Variable				
C	-0.049[.0001]	-0.029[.0067]	-0.075 [.0309]	-
CA	0.039 [.0000]	0.045 [.0000]	0.016[.0000]**	0.098[.0000]**
AGEDUMMY	-0.002[.0029]	-	-0.002 [.0921]	0.005[.0191]**
GEARING	0.008 [.0003]	0.011[.0000]	0.003 [.0000]	0.007[.0000]**
PROFIT	-	-0.029[.0002]	-0.024 [.0185]	0.098[.0000]**
LIQUIDITY	-0.007[.0000]	-0.006[.0000]	-0.008 [.0000]	0.007[.7329]
LOGSIZE	0.081 [.0000]			
LOGSALES		0.061 [.0000]	0.090 [.0000]	0.086[.0000]**
SALESGR	-0.007 [.7643]	-0.011 [.8328]	-	0.008[.0107]**
QUISCORE	4.78E-	5.98E-	8.76E-	0.0001[.0452]*
AUDITDUMMY	-	-0.0109[.3095]	-	0.0091(.0764)*
STDTD			0.120[.0000]**	
STDTD2				-
DUMMYSTDTD				
DUMMYSTDTD2				0.438[.0000]**
DUMMYCA				-
DUMMYPROFIT				-0.191[.0000]
DUMMYLOGSA				-0.039[.0000]
DUMMYAGEDU				-0.033[.0000]
DUMMYSALES				-0.001[.0376]

This table presents the regression results for cost of debt using fixed effects estimation for the period of 1999-2008 for SMEs in the UK. P values are shown in the parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% respectively and the diagnostic test statistics. As far as the diagnostic test are concerned we find no evidence of heteroskedasticity according to White test. Test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation.

The use of different definitions resulted in different sample sizes for each model as indicated in Table 4.5. To address the question, what determine the cost of debt capital, we begin with a simple estimation specification in which we regress COD on all firm specific variables namely, CA, AGEDUMMY, GEARING, PROFIT, LIQUIDITY, LOGSIZE, AUDIT DUMMY, QUISCORE and SALES GROWTH year effect and fixed effect which control for unobserved firm heterogeneity. As our data is panel data we have included both time specific and firm specific error term. Therefore error term has 3 components and αi represents firm specific fixed effects, αt controls for time specific macroeconomic influences and $\varepsilon i,t$ is the idiosyncratic error term. The result of this estimation is presented in the Table 4.4 under the Model 1.

The Model 1 uses the following equation.

$$(COD)_{i,t} = \beta 0+\beta 1\ (CA)_{i,t} +\beta 2\ (AGEDUMMY)_{i,t} + \beta 3(GEARING)_{i,t} + \beta 4\ (PROFIT)_{i,t} + \beta 5\ (LIQUIDITY)_{i,t} + \beta 6(LOGSIZE)_{i,t}+ \beta 7\ (CREDITSCORE)_{i,t} + \beta 8(SALES\ GROWTH)_{i,t} + \beta 9(\ AUDIT\ DUMMY)_{i,t} + \alpha_i+ \alpha_t + \varepsilon_{i,t} \quad 4.2$$

In Model 2 LOGSIZE replaces LOGSALES which measures the size in terms of sales. As a robustness check we have used a different measure for size. The objective of this estimation is to find which measure of size effectively explains the relationship between cost of debt and size.

$$(COD)_{i,t} = \beta0+\beta1\ (CA)_{i,t} +\beta2\ (AGEDUMMY)_{i,t} + \beta3(GEARING)_{i,t} + \beta4\ (PROFIT)_{i,t} + \beta5\ (LIQUIDITY)_{i,t} +\beta6(LOGSALES)_{i,t} + \beta7(SALES\ GROWTH)_{i,t} + \beta8\ (CREDITSCORE)_{i,t} + \beta9(\ AUDIT\ DUMMY)_{i,t} + \alpha_i+ \alpha_t+ \varepsilon_{i,t} \quad 4.3$$

The coefficients obtained from the above (4.3) model does not show the effect of short term debt and long term debt on the COD. As noted in the previous chapter (Chapter 3) that we have found that short term debt is an important source of finance of SMEs in the UK. In order to test this we interact Short Term Debt with other variables using a dummy. The estimated coefficient on the interacted terms are predicted to have opposite sign to that of the explanatory variables on their own in line with the predicted relationship with the explanatory variables. Model 3 shows the other variables that we considered in Model 2 with the STDTD. STDTD is a variable which represents the ratio of STD to TD[70].

$$(COD)_{i,t} = \beta0+\beta1\ (CA)_{i,t} +\beta2\ (AGEDUMMY)_{i,t} + \beta3(GEARING)_{i,t} + \beta4\ (PROFIT)_{i,t}+ \beta5\ (LIQUIDITY)_{i,t} + \beta6(LOGSALES)_{i,t}+ \beta7(SALES\ GROWTH)_{i,t} + \beta8\ (CREDITSCORE)_{i,t} + \beta9(\ AUDIT\ DUMMY)+\beta10(STDTD)_{i,t} + \alpha_i+ \alpha_t+\varepsilon_{i,t} \quad 4.4$$

In Model 4 we have interacted DUMMYSTDTD with CA, PROFIT, LOGSALES, AGEDUMMY, and SALESGR. Then we have introduced DUMMYCA DUMMYPROFIT

[70] See Appendix 4B.

DUMMYLOGSALES DUMMYAGEDUMMY and DUMMYSALESGR to the model. DUMMYSTDTD is 0,1 dummy variable which is equal to 1 for STDTD=1, otherwise 0.

Table 4.5

Results for the regression of micro, small and medium firms.

	Micro			Small			Medium		
Dependant	MODEL 1	MODEL 2	MODEL 3	MODEL 1	MODEL 2	MODEL 3	MODEL 1	MODEL 2	MODEL 3
Adj R squared	COD	COD	COD	COD	COD	COD	COD	COD	COD
Observations	.453	.304	.364	.412	.366	.383	.429	.404	391
F statistic	12089	11498	13129	29098	22653	22657	42983	40019	40028
J Statistic	5.78(.000)	8.98(.000)	5.38(.000)	5.09(.000)	6.81(.000)	7.19(.000)	7.02(.000)	7.69(.000)	
Variables	0.387	0.363	0.392	0.428	0.435	0.446	0.487	0.489	
C	-0.018 (.0209)**	0.009 (.7691)	-0.091 (.1604)	-0.041 (.1506)	-0.047 (.0918)	-0.035 (.3163)	-0.032 (.0714)*	-0.021 (.5904)	0.037 (.1416)
CA	0.076 (.0000)***	0.039 (.0901)*	0.052 (.0022)***	0.029 (.0000)***	0.027 (.0129)**	0.021 (.0769)*	0.032 (.0012)**	0.019 (.1581)	0.010 (.8109)**
AGEDUMMY	-0.002 (.9287)	-0.002 (.6193)	-0.009 (.0443)**	-0.007 (.2122)	-0.006 (.2756)	-0.007 (.6128)	-0.003 (.1934)	-0.003 (.2198)	-0.008 (.0356)**
GEARING	-0.008 (.2128)	-.010 (.0053)**	-0.006 (.2387)	0.001 (.0018)***	0.001 (.0000)***	0.001 (.1845)	0.001 (.0000)***	0.001 (.0000)***	0.001 (.0000)***
PROFIT	0.098	0.132	0.078	-0.069	-0.049	-0.017	-0.018	-0.026	-0.025

	(.0059)**	(.0017)**	(.2383)	(.0287)**	(.0239)**	(.8113)	(.3398)	(.6176)	(.3428)
LIQUIDITY	-.009 (.0189)**	-0.006 (.4178)	-0.004 (.0876)*	-0.002 (.0102)**	-0.001 (.0595)*	-0.003 (.0243)**	-0.009 (.0976)	-0.002 (.0003)***	-0.002 (.0078)**
LOGSALES	0.023 (.0000)***	-0.013 (.7756)	0.006 (.3198)	0.008 (.0001)***	0.007 (.1029)	0.007 (.0432)*	0.009 (.0001)***	0.006 (.0118)**	0.004 (.0001)***
SALESGR	-0.001 (.0000)***	-0.001 (.0001)***	-0.001 (.0912)	-0.001 (.0000)***	-0.001 (.0417)**	-0.001 (.7583)	-0.001 (.6198)	-0.001 (.9765)	-0.002 (.2128)
AUDITDUMMY	0.032 (.1028)	0.045 (.1872)	0.078 (.0179)**	0.012 (.9165)	0.023 (.3923)	0.007 (.6764)	-0.007 (.5876)	-0.006 (.5843)	-0.007 (.8038)
STDTD		0.408 (.0000)***			0.394 (.0000)***			0.198 (.0000)***	
STDTD2		-0.298 (.0000)***	0.049 (.0004)***		-0.298 (.0000)***	0.051 (.0004)***		-0.229 (.0000)***	0.010 (.2981)
DUMMYSTDTD			-0.046 (.1489)			-0.048 (.1925)			-0.100 (.0000)***
DUMMYCA			-0.033 (.0409)**			-0.049 (.0851)*			0.023 (.1309)
DUMMYPROFIT			-0.039 (.6978)			-0.089 (.1187)			-0.088 (.1325)
DUMMYLOGSALES			-0.001			-0.006			0.006

			(.7987)			(.7278)			(.0027)**
DUMMYAGEDUMMY			-0.007 (.7187)			0.006 (.9287)			0.002 (.9318)
DUMMYSALESGR			0.078 (.0178)**			0.004 (.0904)			0.007 (.2592)

This table presents the regression results for cost of debt of micro, small and medium firms using fixed effects estimation for the period of 1999-2008. P values are shown in the parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% respectively. As far as the diagnostic test are concerned we find no evidence of heteroskedasticity according to White test.Test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation.

Table 4.5 shows the regression results for cost of debt for the micro, small and medium size firms. In the Model 1 we have included all the variables.

$$(COD)_{i,t} = \beta0 + \beta1\ (CA)_{i,t} + \beta2\ (AGEDUMMY)_{i,t} + \beta3(GEARING)_{i,t} + \beta4\ (PROFIT)_{i,t} + \beta5\ (LIQUIDITY)_{i,t} + \beta6(LOGSALES)_{i,t} + + \beta7(SALES\ GROWTH)_{i,t} + \beta10(AUDITDUMMY)_{i,t} + \alpha_i + \alpha_t + \varepsilon_{i,t} \quad 4.5$$

Model 2 shows the all the variables in the basic model, STDTD and STDTD2.

$$(COD)_{i,t} = \beta0 + \beta1\ (CA)_{i,t} + \beta2\ (AGEDUMMY)_{i,t} + \beta3(GEARING)_{i,t} + \beta4\ (PROFIT)_{i,t} + \beta5\ (LIQUIDITY)_{i,t} + \beta6(LOGSALES)_{i,t} + + \beta7(SALES\ GROWTH)_{i,t} + \beta10(AUDITDUMMY)_{i,t} + \beta11(STDTD)_{i,t} + \beta12(STDTD2)_{i,t} + \alpha_i + \alpha_t + \varepsilon_{i,t} \quad 4.6$$

In Model 3 we have interacted DUMMYSTDTD with CA, PROFIT, LOGSALES, AGEDUMMY, and SALESGR. Then we have introduced DUMMYCA DUMMYPROFIT DUMMYLOGSALES DUMMYAGEDUMMY and DUMMYSALESGR to the model. DUMMYSTDTD is 0,1 dummy variable which is equal to 1 for STDTD=1, otherwise 0.

$$(COD)_{i,t} = \beta0 + \beta1\ (CA)_{i,t} + \beta2\ (AGEDUMMY)_{i,t} + \beta3(GEARING)_{i,t} + \beta4\ (PROFIT)_{i,t} + \beta5\ (LIQUIDITY)_{i,t} + \beta6(LOGSALES)_{i,t} + + \beta7(SALES\ GROWTH)_{i,t} + \beta10(AUDITDUMMY)_{i,t} + \beta11(STDTD2)_{i,t} + \beta12(DUMMYSTDTD2)_{i,t} + \beta13(DUMMYCA)_{i,t} + \beta14(DUMMYAGEDUMMY)_{i,t} + \beta15(DUMMYPROFIT)_{i,t} + \beta16(DUMMYLOGSALES)_{i,t} + \beta17(DUMMYSALESGR)_{i,t} + \alpha_i + \alpha_t + \varepsilon_{i,t} \quad 4.7$$

4.7 Results and Discussion

To address the question, what determine the cost of debt capital, we begin with a simple estimation specification in which we regress COD on CA, AGEDUMMY, GEARING, PROFIT, LIQUIDITY, LOGSIZE, SALESGR, QUISCORE and AUDITDUMMY year effect and fixed effect which control for unobserved firm heterogeneity. The results of this estimation are presented in the Table 4.4 under the Model 1. J statistic is a test for the overidentifying the restrictions distributed as chi-square under the null of validity of instruments which shows that instruments we are using are correct and our model is correctly specified.

As shown in the Table 4.4 and 4.5 the adjusted R-squared values are relatively high. Further, the estimated coefficients, including the constant are in most cases show the expected relationship with cost of debt except SIZE and CA.

In Model 1 the results show that except AGEDUMMY all other variables are highly significant. As expected, age is negative but not significant. LOGSIZE and CA do not show the expected relationship but they are highly significant. In the Model 2 we use LOGSALES to measure the size and the results show that age remains negative and insignificant. These findings mean that the cost of debt capital is higher for younger firms even after within firm changes and unobservable firm heterogeneity, as captured by firm fixed effects, are controlled for. AUDITDUMMY shows the expected sign with the cost of debt and significant only in Model 3. The variable which measures the creditworthiness, QUISCORE is not significant and does not show the expected sign in any of the estimations. Studying the Table 4.4, the

intercept, is consistently negatively signed in all model and highly significant in almost all the cases.

The last column (Model 4) as explained before the interacted variables with DUMMYSTDTD namely DUMMYCA, DUMMYPROFIT, DUMMYLOGSALES, DUMMYAGEDUMMY, and DUMMYSALESGR. Except DUMMYSALESGR all other variables are highly significant and show the expected relationship. This implies that short term debt is more important in determining the cost of debt.

The estimated coefficient on AGEDUMMY is negative in all cases except in Model 4 although it is significant only at the 5 percent, 5 percent and 10 percent significance levels in MODEL 1, 2 and 3 respectively. This negative sign is consistent with the pecking order theory as we shown in Table 4.1. The first estimation reported in Table 4.4 suggests that when small businesses are more than 10 years old, its cost of debt capital decrease by 2 basis point. Then we interact the sample of the firms that use only short term debt and both short term and long term debt. The finding shows that when we interact the sample that consist of the firm that are less than 10 years old, the effect of aging on the cost of debt capital is somewhat larger for younger firms. This is again confirm that reputation of the firm has a bigger impact on cost of debt irrespective of the way they finance (short term or long term). DUMMYAGEDUMMY which is the interacted variable with short term debt shows a negative relationship with the cost of debt. This is consistent with the earlier finding of Peterson and Rajan (1994), on the effect of age on the cost of debt.

The results obtained for SIZE are relatively strong for the variable measuring in terms of log turnover and log size. Size is consistently positively related with the cost of debt. This is different from the expected relationship and these findings are inconsistent with the information asymmetries and pecking order theory explanations. But in Model 4 the interacted variable with DUMMYSTDTD is highly significant and show negative relationship with cost of debt as expected. This gives us a signal that COD is reduced for larger firms when they employ only short term debt in financing their business activities. Again this is an indication of the importance of size in determining cost of debt capital and thus the nature of the relationship between external finance and cost of debt in terms of short term debt is confirmed the panel data procedure. Antoniou et al (2008)[71] argues that different transaction and contracting costs discourage small firms from raising external funding forcing them to rely on their retained earnings. Hence, they are likely to borrow short-term bank debts in order to avoid diseconomies of scale and the costs of financial distress. Storey (1994) has confirmed the same that many small business owners are strongly opposed to sharing ownership either with financial institutions or with other individuals and so use short term debt financing.

The other inconsistently signed variable in Table 4.3 is collateral assets CA. This variable is highly significant at 1% significance level in all cases but shows positive relationship with the cost of debt capital. These findings are inconsistent with the this study's expectation of a negative link between cost of debt and collateral assets and trade off explanations as given in

[71] This paper aims to investigate the determinants of choice between private and public debt for British and German listed companies and concludes that relation between dependent and independent variables is country dependent and evidence record few similarities in debt mix structure of two countries. Findings confirm that the debt ownership decision of listed firms is not only depend on firm characteristics but also the outcome of legal and financial environment and corporate governance.

Table 4.1. How to interpret these positive coefficients of CA is not clear. May be this is an indication of highly risk borrowings. Higher the risk greater the collateral requirement. Hence this is a measure of risk and this could be an indication of the SME in the UK are highly risk borrowers. Further this could be due to the counter-intuitive nature of the lenders. Since the SMEs generally expose to greater risk, collateral assets that they have would be unattractive security option for high risk firms and the same assets would make more attractive security for low risk firms.

The firm profitability measure coefficient is significant in all cases. This significance and the negative correlation with the cost of debt is consistent with the pecking order theory and agency theory. These findings further suggest that more profitable firms pay less for their external finance and that growth orientation increases the costs of external finance. Further this is consistent with Krishnan and Moyer (1997) that there is negative relationship with profitability[72]. So the importance of firm profitability in determining the cost of debt capital and the nature of the relationship between external finance and profitability is clear from the panel data procedure.

Liquidity is negatively related to the cost of debt and in all the cases it is highly significant. Liquidity factors are indeed likely to be more important in determining cost of debt since customers are more likely to pay cash in SMEs. As a measure of short term firm risk liquidity shows a negative relationship which implies that firm has required short term funds for

[72] Supporting the pecking order hypothesis of Myers(1984), Krishnan and Moyer (1996) explained that firms with higher reserves have lower cost of capital whereas negative coefficient for profitability is inconsistent with Omran and Pointon(2004) reveals that firms with higher reserves have a higher cost of capital.

financing and it reduces the risk of non-availability of funds. As a result of this firm cost of debt capital will be reduce as there is sufficient funds available for profitable investment. Hence it is not surprising that liquidity is a factor that explains the cost of debt capital.

For the SME the coefficient of sales growth is negative and is not statistically significant in first 2 cases. Only in Model 3 and 4 it is significant but in Model 4 it is positive. The negative coefficient is consistent with what the pecking order theory predicts.

Financial and business risks are key factors, as indicated by gearing. The sign of the coefficient is positive as expected and all the Models show highly significant at 1% significance level. However these findings are inconsistent with the Omran and Pointon (2004) where they found a negative relationship.

AUDITDUMMY which measures the riskiness of the firm is significant in the Model 3 and Model 4 shows the expected link with the cost of debt. This supports the conventional wisdom that if one default on payments and/or does not comply with accounting regulations, the cost of external finance will increase.

Table 4.6

Summary results of the empirical analysis

Variable	**Expected sign**	**Estimated coefficient**
C		Highly significant at 1% significant level and consistently negative.
CA	-	Consistently positive and highly significant at 1% significant level. Interacted equation with DUMMYSTDTD shows the negative correlation.
AGEDUMMY	-	Consistently negative and weakly significant at 5% and 10% level in 3 cases out of 6.
GEARING	+	Highly significant at 1% significant level and positive in all cases.
LIQUIDITY	+-	Highly significant at 1% significant level and consistently negative.
PROFIT	-	Except model 2 significant in all cases and negatively correlated.
LOGSIZE	-	Consistently positive and highly significant at 1% significant level. Interacted equation with DUMMYSTDTD shows the negative correlation.
LOGSALES	-	Consistently positive and highly significant at 1% significant level. Interacted equation with DUMMYSTDTD shows the negative correlation.
SALESGR	-	Negative And highly significant with STDTD.
AUDITDUMMY	-	Negative and significant in one Model only
QUISCORE	+	Positive and insignificant.

The above summary relates to the overall estimation shown in Table 4.4. In addition to the overall estimation we have split the sample in to three based on the size[73] of the firm and estimated explanatory variables and residuals from fixed effects model. Table 4.4[74] shows the empirical estimation results for the determinants of cost of debt concentration by firm size. According to the results shown in Table 4.4 it is evidenced that the size of the firms matters. In contrast, except LOGSALES and CA all other variables show the expected relationship with cost of debt in medium size firms. It shows that for micro firms higher the profit greater the cost of debt and for small and medium firms it is negatively related to cost of debt. Gearing is also shows a negative relationship with micro firms while positively related with small and medium size firms. As can be seen from Table 4.4 the most interesting implication is that the determinants of cost of debt are highly sensitive to the size of the firm.

4.8 Conclusion.

According to the summary results, particularly from the panel data procedure, give the impression to support the predictions. As illustrated in the factors previously found to be important in determining the cost of debt capital of SMEs and have similar weight on the cost of capital of SMEs in the UK. Using a large panel of UK SMEs, we document the following main conclusions about the determinants of cost of debt.

[73] As the variables (LOGSIZE, LOGSALES) which measure the size of the firm in the estimation did not show the expected relationship and to see what factors are more important in determining cost of debt capital of micro, small and medium firms, we divided the sample in to 3 based on the definition for SME. The results of this estimation clearly show that there is an impact of size on the cost of debt.

[74] In these estimations we have dropped the QUISCORE as that variable is not significant at all in any of the estimations.

The cost of debt has been a popular issue in corporate finance for a long time, however insufficient attention has been paid to the factors that drive the cost of debt in the SMEs. Possibly the most unambiguous finding of this study is that size matters in firm cost of debt determinants. In fact, with the pecking order theory and trade off theory and control considerations cost of debt tends to decrease with the size of the firm. The strong positive relationship with the firms' use both long term and short term debt may be the results of growth opportunities. Particularly it appears that growing firms with needs for external funds prefer long term finance but it is again expensive for SMEs. Strong negative relationship with firms which use only short term finance indicates that SMEs use more short term finance rather long term external finance. This is an interesting finding that shows SMEs are more depend on the short term finance may be they have no access to long term opportunities and even they have access to long term debt they have to pay higher cost compared to the large firms. This also implies that many small businesses are strongly opposed to sharing ownership and use short term debt financing as noted in Titman and Wessels (1988) and Story(1994).

Similarly, the positive sign of collateral assets shows that for the firms which employee both long term and short term finance show higher the collateral higher the cost of debt. But this is not consistent with the theory or some previous studies (Boot et al, 1991). But this is consistent with Niskanen and Niskanen (2010)[75] which implies that collateral is positively associated with the risk involved. Further the interacted variable with DUMMYSTDTD is

[75] Niskanen and Niskanen (2010) find that dispersed ownership structure have easier access to credit and are less often required to pledge collateral. In this case the collateral requirement of SMEs in UK is high as the ownership is cantered to a single person, family or very few people.

consistent with tradeoff theory and implies that short term finance is strongly support the importance of collateral assets in determining the cost of debt. These findings on collateral imply that firms may improve their chances of obtaining cheap debt capital by increasing the number of owners in the firm. The result of this study reported that the size and collateral assets are significantly important determinant of SMEs short term debt cost.

Profit, Gearing and Liquidity appear to be much more important. All these 3 variables are suggested to be very important in determining of SME short term and long term cost of debt. Profit seems to play an important role in determining cost of debt and the implications of this are that SMEs may well limit their growth to the finance they have available internally. This is strictly consistent with the pecking order theory for SMEs but is a major constraint on economic development. Higher the profitability lower the cost of debt indicates that risk is low and this is in line with the trade off and agency considerations. Our investigations also suggest that micro firms cost of debt capital is higher than small and medium size firms. For micro firms higher the profitability greater the cost of debt which means that asymmetric information and moral hazard leads to charge a higher interest rate as asymmetry of information between the lender and the firm obstruct the lender to know the actual risk of the firm.

Finally, even though some variables in Table 4.4 do not show the expected relationship with the cost of debt same as in the overall estimation this evidence provide that size reflects the reputation in financing choices. A micro firm is typically more difficult for outsiders to observe because it produces little public information about the firm and firm has no outside reputation. Likewise medium well established firm built a strong reputation which allows it

to tap cheap credit in external market. In particular, short term debt seem to play more important role specially in micro firms in determining cost of debt.

CHAPTER 5

THE EFFECT OF CAPITAL STRCUTURE ON PROFITABILITY: AN EMPIRICAL ANALYSIS OF SMEs IN THE UK

5.1 Introduction

It is widely reported that in the static trade-off theory[76] of capital structure, a more profitable firm is predicted to have a higher leverage ratio. The empirical relevance of trade off theory has often been questioned. Company chooses the debt and equity mix by balancing the costs and benefits. Competent managers who identify the appropriate mix of debt and equity minimize the firm cost of finance, maximize the profitability and thereby improve the competitive advantage. Different firm specific strategies implemented by the managers to gain the competitive advantage to the firm and thereby enhance the firm value result in performance differences (Gleason et al, 2000).

The previous two chapters focused on capital structure decision and cost of debt capital of SME in the UK, while the objective of this chapter is to analyze the effect of debt policy on the profitability of SMEs in the UK.

The expected return from any investment is the sum of risk free rate and the risk premium or extra return to compensate for the risk. So the profitability is risk free rate plus risk premium. Firm has to consider the risk associated with every single activity very carefully as it affect

[76] This theory explains that corporations usually are financed partly with debt and partly with equity, It states that there is an advantage to financing with debt, the tax benefit of debt and there is a cost of debt financing which include bankruptcy costs and non- bankruptcy costs. The firm that is optimizing its overall value will focus on this trade-off when choosing how much debt and equity to use for financing (Frank and Goyal, 2005).

the return of the investment. In this study we focus on what is the impact of capital structure on the risk premium of SMEs in UK.

This paper contributes to the literature by utilizing recent advances in panel data econometrics to investigate the determinants of profitability for non-financial SMEs in the UK. The primary objective of this chapter is to find the important factors in determining profitability of SMEs in the UK. To this time there has been no UK study of the determinants of profitability of SMEs in the UK.

This chapter is organized as follows. Section 5.2 explains the relevant theoretical background 5.3 review the selected existing literature. In section 5.4 we describe our model of determinants of profitability and in section 5.5 theoretical prediction and data we describe in 5.6. Section 5.7 explain the estimation results and 5.8 the conclusion of the study.

5.2 Theoretical Background

Modigliani and Miller (1958) provided that the well known theory of irrelevance of capital structure where financial leverage does not affect the firm's market value. MM generally viewed this as a purely theoretical result since in order to derive it, they had to assume away many important factors in which would influence capital structure decision. Specifically theory was based on very unrealistic assumptions which we cannot see in the real world such as perfect capital market, homogenous expectations, and perfect competition in which firms operate without taxes and transaction costs that are incurred in trading securities where all the relevant information is available without any cost. This provides the base with which to examine real world and to consider reason why capital structure is relevant. In particular

presence of bankruptcy costs and favorable tax treatment of interest payment lead to the notion of an “optimal capital structure” which maximize the value of the firm and minimize the cost of capital.

MM(1963) revised their former (MM,1958) standpoint by incorporating benefit of tax as a determinant of capital structure choice arguing that employing more debt capital would increase the profit of the firm as interest paid on debt is a tax allowable expense. It is considered that cost of debt would be smaller than equity as the government would be indirectly subsidizing the expenses with interest. This means the value of the tax on revenue would be reduced from the same amount spent on paying interest. Therefore, the profit of the firm would be smaller in comparison with a company without debt. Therefore, Modigliani and Miller (1963) propose that in order to maximize the value of the firm they should use as much debt capital as possible where they ignored the risk. However, as the profit will be proportional to a smaller equity, the profit per share tends to be larger. Later researchers suggested alternatives to the MM theory by introducing agency theory (Jensen and Meckling, 1976), pecking order theory (Myers and Mujlif, 1984) and theory of bankruptcy (Titman,1984).

Theories that have been developed to explain the capital structure of firms include bankruptcy cost, agency theory and pecking order theory. Bankruptcy costs are the increased costs of financing with debt instead of equity that result from a higher probability of bankruptcy. These costs may be higher for the SMEs compared to the larger firms. According to the Warner (1977) and Brealey and Myers(1992) the cost associated to the bankruptcy possibility such as legal and administrative costs would increase with the debt reducing the profitability

and the value of the firm. Titman (1984) shows that bankruptcy costs are the loss in profits incurred by the firm as a result of the unwillingness of stakeholders to do business operations with them. In addition to that the use of debt capital also leads to agency costs.[77] Agency cost arises as a result of the relationship between shareholders and managers (Jenson and Meckling, 1976). Higher leverage can mitigate conflicts between managers and shareholders concerning the choice of investment (Myers 1977).

Agency theory suggests that capital structure decisions should be taken in order to minimize the agency conflicts (agency cost) thus increase the profitability of the firm (Berger 2000). Conflict between the interests of shareholders and debt holders is the one particularly important agency issue. In particular, following a more riskier but higher return strategy benefits the shareholders but not the debt holders. A more risky strategy increases the risk of default on debt, but debt holders being entitled to fixed return will not benefit from higher return for bearing a higher risk. So this may higher the profitability if the higher risk increase the return, however if the risk goes bad, debt holders also have to share the loss which would show a negative relationship between profitability and debt[78].

The trade-off theory, the dominated theory of capital structure predicts that firms will try to maintain optimal capital structure by matching cost and benefit of debt. Trade-off Theory

[77] Agency cost is a type of internal cost that arises from or must be paid in to an agent acting on behalf of a principle. This arises because of core problems such as conflicts of interest between shareholders and management. Shareholders wish for management to run the company to increase the value of shareholders but, the management may wish to grow the company in ways that maximize both their objectives and the best interest of shareholders.

[78] Jensen and Meckling (1976)

introduced by Myers (1984) advocates the necessity of establishing a balance between tax saving arising from debt, decrease in agent cost and bankruptcy, financial distress costs. The firm cannot achieve the ultimate objective of value maximisation if they form a capital structure only with external resources or without any external resources. According to trade-off theory, in order to achieve an optimal capital structure, firms need to establish a balance between costs (Ghosh and Cai, 2001) which would lead to maximize the firm profitability. Firm profitability in a way reflects the effect of different capital structures and differing business risk[79]. Further trade-off theory suggests giving priority to the debt financing considering the benefits of various strengths and the restrictions caused by debt financing costs. So there should be an ideal leverage ratio and profitability and leverage ratio is positively related.

Myers and Majluf (1984) have formulated a pecking-order hypothesis that places debt as the preferred source external financing. The pecking order theory predicts that firms will issue equity as a last resort. Capital structure is created in accordance with the priority order of diversified resources aimed at answering the financial needs of firms (Frank and Goyal, 2007). Specifically, they issue equity when firms exhaust their debt capacity. Thus, firms' debt capacity plays a significant role in the choice and the size of debt financing.

The pecking order explains a negative relationship between capital structure and profitability, why the most profitable firms generally borrow less or vice versa. Not because they have low

[79] In practice firm tend to use target capital structure a mix of debt and equity. Since capital structure mix involves a strategic trade-off between risk and expected return, the optimal capital structure policy must seek a prudent and informed balance between risk and return which maximize the shareholders wealth and minimizes WACC (Gaius, 2007).

target debt ratio but because they don't need external money for financing activities as they have generated sufficient money from the business operations. If the firm has no sufficient funds for their capital investment firm issue debt which makes the firm less profitable[80]. On the other hand it is argued that higher the profitability greater the investment opportunities available. This indicates management is doing a good job and, or firm is undercapitalized. So in order to support the firm activities, operate effectively and grow and make the appropriate investment firm can increase debt capital. Firms with higher tangible assets are expected to have higher debt capacity and lower costs of financial distress thereby increase the profitability. This is consistent with the trade off theory which explains that the tax shield from debt finance thus improves the profitability.

Brealey and Myers, 1992; Gitman, 1997; and Weston & Brightam, 2000 contend that a capital structure concerns the composition of the liability of the company, or more specifically, which is the relative participation of the several financing sources in the composition of the total obligations. Simply the capital structure of a firm concerns the mix of debt and equity the firm uses in its operation. Brealey and Myers (1992) studies the cost associated with the bankruptcy possibility, identifying direct, legal administrative and indirect cost determined by the difficulty of managing a company during its bankruptcy process,. They concluded that such cost increases with the debt capital and it will reduce the firm profitability. If the cost of debt is lower than the cost of equity, the firm with larger degree of financial leverage tends to present in normal conditions of operation, higher ratio of profitability on equity. This means

[80] Higher the borrowing would risk financial distress and lower the return. Financial distress can lead to reduce the efficiency of the management and conflict of interest between bondholders and shareholders. Shareholders interest is to invest in risky project which increase the return but the risky projects are not the interest of debt holders. This also increase the probability of the firm value to decrease further since these projects net present value is negative and cost may occur from lost profit.

that discounting the operational risk uncover from execution of companies business functions by the possibility of occurrence of rates of return lower to the expected ones. According to Brealey and Myers (1992) estimation of cost of each capital source, basically serve to determine the minimum rate of profitability demanded to make the firm's investment more attractive. Brealey and Myers (2003) state that the firm can issue dozens of distinct securities in countless combinations but it attempts to find the particular combination that maximizes the market value of the firm. As each source has a specific cost, the return rate can be influenced in a significant way of each composition.

Booth et al (2001) study the choice of the optimum capital structure in compliance with three models. Firstly the static trade off model confirms that the firm chooses how much debt finance and how much equity finance to use by balancing the costs and benefits. An important purpose of this theory is to explain the fact that firms are usually financed partly by debt and equity. It states the advantages (benefits) and disadvantages (costs) of financing and the marginal benefit of further increases in debt declines as debt increases, while the marginal cost increases so that a firm that is optimizing its overall value will focus on his trade-off when choosing how much debt and equity to use for financing. Secondly, Agency theory suggests that possible conflicts of interests among internal and external interested parties determine the optimal capital structure which increases the profitability and value of the firm that pay off the agency cost with other financial costs. Finally, the Pecking order theory states that firms prioritize their sources of financing from internal financing to equity. Based on the market imperfections and asymmetric information the choice will be based on the possibility of generation of funds to the firm, given the asymmetry of information.

Based on the concept of asymmetric information the concept of optimal capital structure is also expressed by Myers (1984) and Myers and Majluf (1984). Myers (1984) argued with the notion of an optimal capital structure based entirely on the trade off of cost and benefit of debt in a word of information asymmetry between owners and managers. Further he mentioned that corporate financing practice does not confirm with a simple tradeoff model and he suggested the existence of a pecking order among the financing sources used by firms. The existence of information asymmetry between firm and finance providers leads to vary the cost of finance between the difference sources of finance. Condition in which at least relevant information is known to the firm but not to the all other interested parties. Potentially, this could be a harmful situation where one party can take the advantage of other party's lack of knowledge. This may cause the equity holders to expect higher return on their investment and finally this would cost more to the firm which means that equity financing will more costly than debt financing. In the same way this claim is valid for the internal finance and new debt holders. This indicates that debt increases the risk due to asymmetric information and agency problem hence return on equity must also increase. But also the more debt capital cause problems for the debt holders hence the cost of debt would be higher.

If the cost of debt is lesser than the cost of equity the firm with larger degree of leverage could earn higher rate of profitability on equity in the normal business operations. Clarifying the same further, implies that discounting the operational risk determined by the possibility of occurrence of rates of return lower to the initially expected ones. The issue in estimation of cost of each capital source and the practical validity of the weighted average cost of capital is basically provide the minimum rate of profitability demanded to make the firms projects more attractive (Brealey and Myers;2007).

Firms employ variety of techniques and strategies in order to increase the return on equity. Basically, a company can adopt high or low financial leverage as capital structure is one such strategy. The firms have an incentive to maximize debt capital in order to maximize their return on equity. So financial leverage is positively related to the return on equity.

On the other hand higher financial leverage position is coupled with high financial risk. The capital accumulation is at risk of loss if the firm enters into financial distress. In order to protect the reputation of the firm and capital and maintain the financial strength the firm decreases financial risk by taking on low financial leverage position, where the financing decision is linked with operations of the firm. The higher business risk associate with higher return on assets is coupled with lower financial risk over lower financial leverage. Thus, financial leverage is negatively related to the return on assets.

5.3 Review of selected empirical Literature

Review of the selected empirical literature consists of two subsections where section 5.3.1 reviews the previous studies relating to large firms of other countries and UK and small firms of other countries. Section 5.3.2 reviews the literature relating to SMEs in the UK.

5.3.1 Empirical studies on Large and other country Small firms

The relationship between capital structure and the firm profitability has been the subject of considerable debate. Pecking order theory suggests that capital structures are determined largely by the history of needs for external finance and explains negative intra-industry correlation between profitability and debt-equity ratio.

Several early studies suggested that there is a negative correlation between firm performance and leverage. Using the data from retailers in 14 European countries which are grouped into four cultural clusters, Gleason et al (2000) show that capital structure for retailers vary by cultural clusters. Using both financial and operational measures of performance it is shown that a negative correlation between capital structure and firm performance. Using the OLS estimation they suggest that the higher the leverage may cause agency problems which finally lead for a lower performance of the firm.

The concept of productivity, efficiency and effectiveness are related to corporate performance, as these concepts mean the optimal utilization of scare resources (Achabal et al.(1984). Increasing leverage has a positive impact on the firm value and the performance of the company. Researchers (Jenson & Meckling, 1976; Noe, 1988; Goddard et al, 2005) suggest that debt positively affect the firm value and performance.[81] Managers who have actual need of improving firm performance would employ more debt as increasing debt would also increase the bankruptcy and liquidation cost. Survey of chief finance officers by Graham & Harvey (2001) discusses the how managers are concerned with maintaining their financial flexibility which effect their firm credit score. When deciding the credit score firms take in to account the range of factors including firm performance which provide indirect evidence that managers issue debt keeping in view of expected future performance. This means that amount of debt the firm have can influence the marginal cost.

[81] Increase in debt would increase the risk and increase the return on assets as well as due to the tax shield.

Gleason et al (2000) concluded that utilization of different level of debt and equity in the firms' capital structure is a firm specific strategy which influence on firm performance. Using primarily Hofstede's[82] classification of national cultures, and data on European retailers, the result in this study provide conclusive evidence that capital structures vary by cultural classification of retailers. This provides evidence that due to the agency conflicts, retailers over leverage themselves, thus negatively affecting their own performance. Another implication of this study is that larger size is associated with higher performance[83].

Other studies such as Goddard et al (1996) analyze the dynamics of profitability investigating the persistence of profits of 995(796 manufacturing and 199 service) large public limited companies for the period of 1972 in UK manufacturing and service sector firms. Firm size appears to be determinants of persistence of profit for manufacturing but not for services, which suggest that barriers to entry may differ between the two sectors. In service sector than in manufacturing sector, in determining long run profitability industry wide characteristics are important. For both sectors firm size and average growth found to be significant and positively related to long run profitability. Stronger significant of the estimated coefficient in manufacturing sample may be due to the larger number of observations available for

[82] Hofsede (1994) defines culture as the collective programming of the mind which distinguishes the members of one group or category of people from those of another. This definition covers many different cultural factors such as legal environment, tax environment, economic environment and technical capabilities. Another cultural classification scheme is presented by Hofsede (1980) identifies four dimensions of national culture; individualism power distance, masculinity and uncertainty avoidance.

[83] Economic integration in the European Community suggests that aggressive firms, including retailers, should be looking for ways in which firm size can be increased to derive the benefits from economies of scale and market bargaining power.

manufacturing sector. The differences between two sectors is quite small, manufacturers operate in a more competitive environment than service sector firms.

Goddard et al (2005) investigate the determinants of profitability for manufacturing and service sector firms in Belgium, France, Italy, Spain and UK for the period of 1993-2001. Evidence shows that there is a consistently negative relationship between size and profitability, gearing and profitability and positive relationship between liquidity and profitability. The negative significant relationship between gearing and profitability indicates that highly geared firms may tend to suffer as gross profit dedicated to servicing debt increases. Positive relationship with liquidity and profitability would be an indication of adapting quickly to the changing environment and have a beneficial effect on profitability. For all five countries market share and profitability shows positive and significant relationship. Further they have found that in manufacturing than in service sector the positive gradient is steeper and show that European manufacturing firms engage in costly strategies of building excess capacity, advertising and promotion and innovation in order to gain the market share and discourage the new competition.

Goddard et al (2006) using 96 large quoted manufacturing and service companies in UK for the year 1970-2001 applying panel unit root test found that a large proportion of the cross sectional or time series variance in firm level growth rates cannot be explained by variations in firm sizes. Profitability studies based on the persistence of profit hypothesis have typically drawn inferences from a large number of time-series autoregressions for normalized firm-level profit rates in contrast to the cross-sectional orientation of the empirical growth

literature. Time-series behavior of firm level profit indicates the effectiveness of competition in eliminating abnormal profit.

Comparing the persistence of profits Goddard and Wilson (1996) investigate for a new sample of UK firms using data for the period 1972-1991. This study includes a sample of a contingent of service sector firms allowing comparison between manufacturing and service sector. Estimations reveal that average persistence coefficient very slightly higher for service firms than for manufacturers. Measures of initial profitability and long run profitability confirm that relevant correlation coefficient is slightly higher for service firms than for manufacturing firms. This suggests that on average manufactures operate in a more competitive environment with lower barriers to entry than service sector firms. An investigation of firm specific factors and characteristics which explain persistence of profit and long run profitability reveal significant variation in different industrial groups within manufacturing sector. So the different industries might have differences in financing priorities as well as the determinants of profitability for different industries may also be varied. Firm size found to be an important variable of persistence in manufacturing but not in service. This suggests that entry barriers are correlated with the firm size[84]. For both manufacturing and service sector firm size and average growth are both found to be significant and positively related to long run profitability.

[84] Firm size is important in determining the strength of barriers to entry in manufacturing sector, probably through economies of scale. In service sector size is not important in determining the strength of entry barriers. Other than economies of scale, absolute cost advantage or product differentiation, product characteristics or location are important in determining entry barriers in service sector in UK.

Investigating the effect of capital structure on profitability of listed firms on the Ghana stock exchange Arbor (2005) reveal a significantly positive relationship between ratio of short term debt to total assets and ROE. This suggests that profitable firms use more short term debt to finance their business operations. Representing 85% of total debt finance in Ghana short term debt shows the most important component of source of finance. Nevertheless, a negative relationship between the ratio of long term debt to total assets and ROE was found. This is explained by the fact that long term debts are relatively more and employing higher proportion of them could lead to low profitability. This finding is consistent with Miller (1977) and Fama and French (1998)[85]. For the total debt and return rate the results show a significantly positive association. OLS regression results also show that the profitability increase with the size and sales growth.

Arbor (2007) examined the relationship between capital structure and performance of SMEs in Ghana and South Africa during a six year period 1998-2003. The empirical results indicate that short term debt is significantly negatively related to the gross profit margin of both countries and long term debt has significant positive relationship with gross profit margin of both countries. Total debt found to be significantly negative. In the case of Ghana this study found significantly negative association with all the measures of capital structure and return

[85] If the financial markets are competitive and both corporations and investors are taxed then the equilibrium value of the levered firm equals that of the unlevered firm. Miller (1977) show that firm could generate higher after tax income by increasing the debt equity ratio, and this additional income would result in a higher payout to stockholders and bondholders. Debt is substituted for equity, the proportion of firm payout in the form of interest on debt rises relative to payouts in the form of dividends and capital gains on equity. Higher taxes on interest payments than on equity return reduce or eliminate the advantage of debt finance to the firm. Miller (1977) argues that as in MM (1958)value of the firm is still be independent of capital structure and higher the debt capital could lead to lower the profitability. Fama and French (1998) conclude that low debt is associated with higher profit.

on assets while the South African sample shows significantly positive relationship between return on assets and short term debt and trade credit. Both, long term debt and total debt, the results show statistically significant negative relationship with return on assets. These negative relationships imply that SMEs generally are averse to use more equity because of the fear of losing control and therefore employ more debt in their capital structure. In addition to avoid the losing controlling power one other reason to employ more debt capital would be to avoid agency problem. On the other hand employing more debt capital is risky and would cause to result in high bankruptcy cost and ultimately it will cause to reduce the performance of the firm. Arbor (2007) has shown that presence of control variables (firm size, sales growth) and capital structure has a significant influence on the performance of SMEs in Ghana and South Africa. According to Arbor (2005) and Arbor (2007) it is clear that short term debt of listed firms in Ghana and SME shows two different relationships with profitability which suggest that profitable large firms use more short term debt and SME found that short term debt are more expensive.

The study of Sonia Ban˜os-Caballero et al(2009) offers new evidence on the relationship between working capital management and profitability where they found that there is a concave relationship between working capital and level that balances costs and benefits and maximizes their profitability. This indicates that SMEs have an optimal working capital level that maximizes their profitability. In addition to that this study show that firms profitability decreases when they move away from their optimal working capital. The sample comprises SME from Spain for 2002-2007 and use the two step GMM estimator. They found that size, sales growth and leverage negatively correlated with profitability. In addition to the capital structure there are some other factors which affect the profitability.

Teruel and Solano (2006) the effect of working capital management on the profitability of a sample of Spanish SME for the period 1996-2002. Results show that managers can create value by reducing their firms number of days accounts receivable and inventories. In the same way, shortening the cash conversion cycle also improve the firm's profitability. An SME's ROA is reduced by lengthening the number of days accounts receivable, number of days inventory and number of days accounts payable. The same results found by Deloof (2003)86 for large firms confirm the importance of working capital management for firms. Lengthening the payment period improves profitability as it raises sales. So lengthening the number of days accounts payable negatively affect the profitability. They suggested that firm profitability can also be improved by reducing the number of days of inventory. Deloof (2003) further justifies that less profitable firms tend to delay payment of their bills. Teruel and Solano (2006) find that profitability is positively associated with size and growth which could be firms investment opportunities is an important factor allowing firms to enjoy improved profitability.

However, some studies have shown that debt has a positive effect on firm profitability. Confirming the Pecking order hypothesis Hadlock & James (2002) evaluate the possibility of the banking system to provide a certain financial assistance to the companies, confirms that the choice among equity and debt will be fundamentally decide by the market evaluation of share. They analyzed the financing decision of 500 non-financial companies and found that

[86] Deloof(2003) finds that the working capital management is the part of short run policy of the firm and further the components of the working capital, accounts receivable and payable, inventories are highly related to the profitability.

those that were sub-evaluated chose bank financing. As the market interprets the loan as a positive force which enhances their return the company prefer the bank loans. Hadlock & James (2002) concluded that companies prefer debt financing as they anticipate higher return. It is believed that large debt holders have an interest in seeing that managers take performance improving measures.

Analyzing the relationship among taxes, financing decision and the firm value Fama and French (1998) concluded that debt does not allow tax benefits. They argue that if the earning, dividend and investment in the full regressions do not capture all the information in debt about profitability, the regressions cannot isolate the tax effects of debt as the debt slopes are mixes of tax, agency, asymmetric information, bankruptcy and proxy effects. Because, the negative information about debt (agency, asymmetric information and bankruptcy) overwhelms any tax or other benefit of debt. So, the high leverage degree generates agency problems among shareholders and creditors that predict negative relationship between leverage and profitability.

The finance theory and literature argue that the firms actually have more debt in their capital structure than is appropriate. According to Harris and Raviv (1991) higher level of debt support the interest of managers and shareholders and managers may under estimate the costs of bankruptcy reorganization or liquidation. These leads to higher level of debt than appropriate in the capital structure which would then result in lower performance. Harris and Raviv (1991) argued that capital structure is related to the trade-off between cost of

liquidation and return from liquidation to both shareholders and managers[87]. Thus, firms might have more debt capital in their capital structure than is suitable as it gains benefits for both shareholders and managers which of course mitigate the agency problem too.

Ananiadis and Varsakelis (2008) using panel data analysis for data from the Athens Stock Exchange (ASE) addresses the two questions assuming the national culture and the legal tradition of Greece. First, does the capital structure affect the performance in the same way as in the mature economies? and the second does the short run financial policy of the firm affect the performance under what circumstances?. Using the data for the period of 1995-2000 of 130 industrial firms listed on ASE they find that with respect to the impact of capital structure on ROA, are similar to those found in countries with similar financial sector to the Greece[88]. Further they find that WCM, financial leverage has a positive impact on profitability and high inventories turnover may lead to lower sales and consequently to low profitability

In answering the question that how much the industry matter in explaining the firm performance Powel (1996) finds that industry membership only explains 20% of financial performance. Using a sample of undiversified firms competing in variety of industries of

[87] If the cash flow is poor debt gives investors the option of liquidation. The costs here are the information costs associated with determining whether or not liquidation should occur. Higher levels of debt make default more likely thereby making the liquidation decision more appealing. Consequently, firms with higher liquidation values will have more debt than those with lower liquidation values.

[88] This study explains two reasons similar to other studies on profitability. One is the culture of high uncertainty avoidance national culture and the pro-creditor commercial law. In this case managers consider that the bankruptcy cost of financial distress, for the firm and themselves, is high and to minimize these cost they choose low debt and high equity. The other reason is that restructure the capital structure in favor of equity in times of stock exchange expansion as lower cost of transaction.

Federal Trade Commission Line of Business data Powel(1996) conclude that not all of the unexplained performance variance attributable to firm specific factors as some will also attributable to shared generic strategies, strategic group membership, other shared resources or chance. Further this study address the shortcomings in the previous methodologies such as incorporation of personal interviews with the CEOs.

5.3.2. Empirical evidence on SMEs in the UK

In relation to the SMEs Roper (1999) for UK data, suggests turnover growth and return on assets are only weakly related in the short-term, above average growth rates are therefore no guarantor of high profitability. They found that SME performance is shown to depend on strategy choice with turnover growth being particularly strategy dependent. This study develops a simple structural model relation to the small business performance firms' market position and the characteristics of their owner- managers.

Glancey (1998) investigate the determinants of growth and profitability in small manufacturing firms in Tayside region in Scotland using 38 firms for the period of 1988-1990. The paper examines the impact of key determinants such as size, age, location and industry group of small firm performance identified by the previous literature. Findings of this paper suggest that entrepreneurs in the larger firms are motivated by financial factors and for the smaller firms lifestyle factors are the motivational factor. Firm characteristics are found to be of limited in explaining the firm profitability. Glancey (1998) confirm that an older firm may have a more rigid organizational structure not in line with the changes in the up to date

market conditions can negatively effect the firm performance and found that size does not affect the performance.

To sum up, firms with higher bankruptcy cost (higher risk firms) tend to have less debt in their capital structure. The lower the level of debt reduces the overall risk. Firms with higher agency costs tend to have more debt capital in their capital structure. From the above literature analysis it is understandable that profitability can be improved by reducing the agency cost as agency cost plays major role in achieving the optimal capital structure. Similarly is it also noticed that owner managed firms are more willing to take risk than managerial controlled firms.

The review of empirical studies which have been carried out worldwide confirm the factors that determine the profitability. Firm size, leverage, industry type, liquidity, age ownership characteristics and sales growth are the popular variables among the researchers. Theses studies vary from each other as they have used different periods, countries, industries and firm specific factors.

With respect to the previous studies this paper adds new evidence about the effect of capital structure on the profitability of SMEs in the UK which are much less common in the economics literature. However these studies have also applied the theories which were originally developed using the larger firms. Thus there has been substantial amount of

empirical studies in relation to the large firms. The relationship between explanatory variables and their measurements are based on the above review.

5.4 Model of determinants of profitability

5.4.1 Empirical Model

The empirical procedure utilizes the all the available observations from 1998-2008 for all the firms described as above.

5.4.1.1 Panel data Procedure

Panel character of data allows for the use of panel data methodology. The process of estimation of equation will be the Panel Two Stage Least squares. Panel data sets possess several major advantages over conventional cross-sectional or time-series data sets (e.g., Hsiao (1985a, 1995, 2000). Panel data usually give the researcher a larger number of data points which increase the degree of freedom and reduce the collinearity among the explanatory variables thus improve the efficiency of econometric estimate. This approach is more useful than either cross section or time series alone[89].

The coefficient on the independent intercept ($\alpha 0$) can vary across companies and over time. The simplest model is to pool the data in which case there is one fixed intercept. It is unlikely that the profitability models are fully specified. For example there are no available proxies for factors like the magnitude of distress costs or industry effects that are important to the profitability. Moreover the data is unbalanced, as the number of observations for each

[89] As this study collect data from SMEs the availability of data for the whole period of study is not fulfilled. So it is helpful in this analysis to use panel data instead of cross section or time series.

company is different. Thus, a simple pooling might not result in either efficient or unbiased estimates. The fixed effect model allows us to use the data, while the intercept is allowed to vary across firms and time. The effects of omitted explanatory variables can be captured in the changing company intercept. In addition to that by including a fixed time effect the model automatically assess the impact of the macro environment on profitability.

Model estimation using panel data requires first to determine whether there is a correlation between the unobservable heterogeneity of each firm and other control variables of the model. We would obtain the consistent estimation by means of the within–group estimator, if there is a correlation (fixed effects). If not,(random effect) the more efficient estimator can be achieved by estimating the equation through Generalized Least Squares(GLS).

Using the Hausman(1978) test it can be determined whether the effects are fixed or random under the null hypothesis[90] $E(\eta i/X_{it})$. Here X_{it} is all other regressors.

[90] If the null hypothesis is rejected the effects are considered to be fixed. The model can be estimated by OLS. Accepting null hypothesis would mean to have random effects and the model have to be estimated by GLS. More efficient estimator of β we achieve in this way.

The basic model can be written as,

$$Y_{it} = \alpha i + \Sigma \beta k \, Xk_{,it} + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (5.1)$$

Fixed effect model allows different intercepts for each individual firm and firm specific effects are assumed constant over time (αi is firm specific constant term).

It is assumed here that the slope and intercept coefficients are the same across the firm and time (See Baltagi,2001; Gujarati, 2004). So OLS provides consistent and efficient estimates of α and βk where the above equation (5.1) be converted into;

$$Y_{it} = \alpha + \Sigma \beta k \, Xk_{,it} + \lambda t + \eta_i + \varepsilon_{i,t} \quad (5.2)$$

α is the overall constant for all firms.

By performing the F- test we could test the joint significant of dummies. i.e. H0: $\mu_1 = \mu_2 = \ldots = \mu_{N-1} = 0$ by performing an F- test[91].

We measure the effect of capital structure on profitability. The model for the empirical investigation can be stated as follows.

$$ROA_{i,t} = \alpha_0 + \alpha_1 \, LIQUIDITYRATIO_{i,t} + \alpha_2 \, LOGSIZE_{i,t} + \alpha_3 \, GEARINGRATIO_{i,t} +$$

$$\alpha_4 \, STDTD_{i,t} + \alpha_5 SALESGR_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (5.3)$$

Where the subscript i denotes the cross section, i= 1,2…n and t denotes the time t=1,2…n. ROAi,t is return on assets of firm i in time t, LIQUIDITYRATIO i,t is liquidity of firm i in

[91] See Chapter 4 of Baltagi(2001).

time t, LOGSIZE i,t is sales or total assets of firm i in time t, GEARINGRATIO i,t is the financial leverage of firm i in time t, STDTD i,t is the short term debt as a ratio of total debt of firm i in time t and SALESGR i,t is the sales growth of firm i in time t. The parameter λt is a time dummy variable to pick up aggregate factors which influence profitability, although does not allow variation across firms, ηi the unobservable heterogeneity of each firm and εi,t measures the random disturbance. Like Krishnan and Moyer (1997) we also use two proxies to measure profitability[92].

An alternative model for equation 5.3 can be written as follows with the proxy of the dependent variable.

$$ROCE_{i,t} = \alpha_0 + \alpha_1 LIQUIDITYRATIO_{i,t} + \alpha_2 LOGSIZE_{i,t} + \alpha_3 GEARINGRATIO_{i,t} +$$

$$\alpha_4 STDTD_{i,t} + \alpha_5 SALESGR_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t} \qquad (5.4)$$

Where all variables are defined as above excluding the dependent variable, $ROCE_{i,t}$. $ROCE_{i,t}$ is the return on capital employed of firm i in time t.

5.5 Theoretical predictions

The following predictions have summarized based on the trade off theory, pecking order theory, agency theory and the previous empirical studies to capture the impact of other variables on profitability.

[92] See appendix 5A for detailed variable definition and descriptive statistics are included in Table 4.2. ROA shows how well the management is employing the company's total assets to make a profit and ROCE provide more comprehensive evaluation of how well management is using the debt and equity it has at its disposal.

5.5.1 Profitability.

The pecking order theory of Myers (1984) Myers and Majluf(1984), and Shyam-Sunder and Myers(1999) suggest firms prefer to finance investment first from retained earnings, second from debt and third from equity. More profitable firms should have lower leverage ratio than less profitable firms as they are able to finance their investment opportunities with the retained earnings according to the theory. Moreover the theory says that leverage has a negative effect on the firm profitability. This idea is strengthen by Gleason et al (2000), Arbor (2005) and Arbor (2007) more profitable firms tend to use earnings to pay debt and therefore they would have a lower leverage than less profitable firms.

In this study two profitability measures are used in which one indicate the firm management use total assets to make profit and other indicates how well management use the debt and equity capital to enhance the firm profitability. The profitability is measured using the Return On Assets (ROA) (Abor,2007;Arcas and Bachiller, 2008;Goddard et al,2005) and return on capital employed (ROCE)(Krishnan and Moyer,1997).

5.5.2 Leverage

In the literature the leverage is measured in several methods. Three leverage measures use in this study are total debt to total assets, long term debt to total assets or short term debt to total assets[93] and gearing ratio. Since long-term debt is issued more rarely, it may measure a longer run relationship and may be more insensitive to unexpected financial crises than is total debt (Krishnan and Moyer,1997). Highly geared firms tend to suffer as the proportion of gross

[93] Both ratios are measured for each year.

profits dedicated to servicing debt increases and the proportion accruing to shareholders shrinks accordingly (Goddard et al, 2005). They found that the relationship between gearing and profitability is negative.

According to the agency cost hypothesis the higher debt or low equity to capital ratio reduces the agency cost. There are several measures that can be used as a measure as leverage such as debt to total assets is used as the leverage measure and debt to equity can also be used as a measure of leverage. In this study leverage is measured by debt to equity ratio.

5.5.3 Size

Natural logarithm of Assets measure the firm size and inclusion of assets in the model allow for the possible relationship between size and profitability of the firm. In addition to that here we use log turnover of the firm as a proxy for the size. It has been suggested that firm size should be positively related to the profitability of the firm[94]. In addition there are economies of scale in transaction costs associated with long term debt that are not available to smaller firms. Small firms may be borrowing more because the relative cost of issuing equity is higher for them (Titman and Wessels, 1988) which ultimately reduce the profitability. Goddard and Wilson (1996) found that size to be an important determinant of profitability in manufacturing sector and entry barriers are correlated with firm size. Alternatively Goddard et al (2005) argue that growth tends to lead diseconomies of scale, the relationship between size and profitability could be negative.

[94] See Goddard and Wilson(1996),Abor(2007)

5.5.4 Liquidity ratio

Liquidity indicates rate at which the firm is able to react to sudden changes in the environment. A firm holding a high proportion of liquid assets is less exposed to sudden changes in its financial position. High liquidity reduces the exposure to the risk of being unable to meet short term financial commitments. For a sample of Belgian firms Deloof (2003) find that effective liquidity management (working capital management) is an important driver of corporate profitability. On the other hand, holding a higher level of liquid assets may restrain its ability to make use of profitable long term investment opportunities. This implies that there is a negative relationship between profitability and liquidity. Deloof (2003) find a significant negative relation between gross operating income and the number of days accounts receivable, inventories and accounts payable of Belgian firms. For a sample of SMEs in Spanish for the period of 1996-2002 Teruel and Solano(2006) find a significantly negative correlation between profitability and liquidity. Goddard et al (2005) find a positive relationship between the profitability and the liquidity ratio.

5.5.5 Short term debt

This variable measures the affect of short term debt to total debt on profitability. Arbor (2005) and Arbor (2007) study the effect of capital structure on the corporate profitability and found that there is a positive relationship between short term debt ratio and profitability. Increase in short term debt tends to be less expensive and therefore this would increase the profit of the firm.

5.5.6 Long term debt

This measures the impact of long term debt to total debt (LTD) on profitability. Previous studies (Booth et al, 2000; Arbor, 2005; Arbor, 2007) show that there is a negative relationship between LTD and profitability. This implies that higher the LTD decreases the profitability as LTD is relatively more expansive.

5.5.7 Sales growth

Sales figures reflect both long term and short term changes of the firm. Sales growth is an indicator for the demand for the firm's goods and services. Increase in sales will allow increase of the assets via the profit generated. Arbor(2005) shows that there is a positive relationship between profitability and sales growth[95].

The following Table (5.1) shows the expected sign of the explanatory variables based on the literature.

Table 5.1

Expected sign of the variables

Variable	Theory/Empirical	Expected	Rational
LIQUIDITYRATIO	Goddard et al (2005)	+/-	High liquidity reduces the exposure to the risk of being unable to meet short term financial commitments. On the other hand keeping higher level of liquid assets restrains the ability to make use of profitable

[95] $(Sales_1-Sales_0)/Sales_0$

			long term investment.
GEARINGRATIO	Goddard et al (2005)	-	Highly geared firms tend to suffer as the proportion of gross profits dedicated to servicing debt increases and the proportion accruing to shareholders decrease accordingly.
SDA	Abor (2007), Abor (2005)	+/-	Increase in STD with a relatively low interest will lead to increase/decrease profitability.
LDA	Abor (2007), Abor (2005)	-	Increase in LTD is associated with decrease in profitability.
TDA	Abor (2007), Abor (2005)	-/+	Increase in TD is associated with an increase in profitability.
LOGSIZE	Goddard and Wilson(1996)	+	Higher the size greater the profitability.
LOGSALES	Goddard and Wilson(1996)	+	Higher the size greater the profitability.
SALES GROWTH	Abor (2005)	+	Growth in sales directly related to the growth in profitability.
STDTD	Abor (2005)	+	Higher the short term debt higher the profitability.

5.6 Data

Data was obtained from the FAME database. Selecting all firms from all industries reduce the problems associated with selecting a sample from specified industries. This study selects all

private limited firms in all sectors (except finance sector) SMEs in the UK. Finance sector has excluded from the data as their financial characteristics and use of leverage is substantially different from other companies. We use data from 1998-2008. Our analysis cover data from 1999-2008 as data for year 1998 are used to calculate some variables for 1999. We dropped companies with zero sales. We remove all outliers in the dataset by excluding observations that lie in the 1% tails of each regression variable. Finally the selected sample[96] consists of unbalanced panel of 54183 firms.

5.7 Estimation and Results

Table 5.2 shows the descriptive statistics and correlation matrix for all the variables for total sample, sectors and by broad sectoral classification of manufacturing and service. Table 5.2 is divided in to two panels A and B. Panel A represent the mean, standard deviation and observations for the dependent and independent variables. Panel B represent the correlation matrix. Descriptive statistics show that average ROA is 7.3%, while ROCE is 25%. The average log sales are 7.6 million and log size is 4.75 million. There are number of important points to note when looking at the mean of gearing ratio, that firms are highly levered on average. Financial leverage is very high for the SMEs in the UK. The average sales growth is 0.063 for SMEs in the UK during the period under study. TDA 79.9% indicates that approximately 80% of total assets are financed through debt, of which 47% short term debt and 33% long term debt showing the fact that UK SMEs are largely depend on short term debt for financing their operations may be due to the difficulty in accessing long term finance or young firms are resistant to use external finance and rely on internally generated funds.

[96] Appendix 5B shows the number of firms stratified by years.

However as can be seen from the Panel A of Table 5.2, the standard deviation is very much higher for almost all the variables.

There does not appear to be high correlation between any of the explanatory variables except the proxies of profitability and size[97]. As expected the variables that alternatively represent the firm size and profitability shows a high and positive correlation. The correlation coefficient between LOGSIZE and LOGSALES is 0.79, while that between ROA and ROCE is 0.81.

With regard to the sector statistics sector 7 that is business and service sector shows the highest standard deviation for most of the variables such as ROA, ROCE, LOGSALES, GEARINGRATIO, TDA and LDA. All sectors shows minus mean growth for sales. Mean ROA is negative for sector 1 (Agriculture, forestry and mining), sector 6 (Transport and communication), and sector7 (Business and service) indicating that the companies have bad performance (negative assets) in the analysed period. The highest average ROCE reports in the construction sector (sector 3) which is 43%.

It can be seen that the average profitability in the manufacturing firms is greater than that of the service sector firms. This means that in manufacturing sector risk is higher than in service sector. This is consistent with the Goddard et al (2005) for large firms in UK and some other

[97] As can be seen in the correlation matrix STDTD and LDA, LDA TDA, SDA TDA, STDTD SDA, TDA GEARINGRATIO and SDA GEARINGRATIO are also highly correlated because they all are alternative measures of leverage.

EU countries during mid 1990s. On average manufacturing firms use less debt than service sector firms do. Statistics shows that service sector firms finance its total assets using approximately 95% of debt capital. However the dispersion of data is very high for the service sector.

In relation to the standard deviation of the variables it is verified that the all the variables show very high standard deviation. Goddard et al (2005) show in their study that the UK sample represents firms from different risk levels as well as broad sectoral classification of manufacturing and services. This is because the sample represents diverse set of firms[98].

[98] Pl see the sample selection under data (5.3.2) and the definition for SME in Chapter 2. The sample has 2055 firms with 1 employee, 10700 firms with 5 or less employees and 15135 firms with 10 or less employees.

Table 5.2: Summary statistics for the dependent and independent variables

Panel A: Descriptive Statistics

Variable	Total Sample			Sector 1			Sector 2			Sector 3		
	Mean	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**
ROA	0.073	24.555	581774	-0.241	14.469	8142	0.103	15.328	90332	0.248	11.065	39079
ROCE	25.027	114.61	506579	12.103	99.919	7239	16.460	90.537	80778	43.395	117.912	32085
LOGSALES	7.642	294.444	355842	7.566	2.273	5161	8.578	1.628	64472	7.969	2.143	25120
LOGSIZE	4.751	3.786	867195	5.267	4.022	12056	6.371	3.636	115258	5.221	3.748	54923
GEARINGRATIO	265.108	791.403	377624	245.996	794.237	5793	212.946	646.313	74641	218.096	703.157	32264
LIQUIDITYRATIO	3.183	7.832	505694	3.608	8.945	7019	1.849	4.356	76987	1.536	3.348	33932
SALESGR	0.063	294.444	287939	0.074	19.920	4238	0.059	27.613	54213	-0.048	849.702	20350
TDA	0.799	51.693	581774	0.746	12.411	8142	0.565	16.266	90335	0.335	4.489	39079
SDA	0.467	16.975	581774	0.590	12.376	8142	0.311	4.254	90335	0.262	4.137	39079
LDA	0.331	48.293	581774	0.156	0.993	8142	0.254	15.687	90335	0.073	0.913	39079
STDTD	0.716	0.365	400090	0.689	0.366	6068	0.716	0.340	76804	0.777	0.301	30720
Variable	**Sector 4**			**Sector 5**			**Sector 6**			**Sector 7**		
	Mean	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**
ROA	0.055	15.311	86675	0.013	1.898	13561	-0.038	20.109	25922	-0.017	36.716	171993
ROCE	21.889	90.657	76361	17.536	91.139	11612	24.106	104.2618	22497	34.685	144.079	146045
LOGSALES	8.637	1.819	60065	7.395	1.670	9471	8.156	1.910	18976	6.958	2.324	120108
LOGSIZE	6.055	3.585	111969	5.072	3.993	20526	5.603	3.697	34815	4.208	3.795	275593
GEARINGRATIO	237.285	691.197	69979	375.118	951.372	9553	265.643	734.182	18966	347.706	953.195	100678
LIQUIDITYRATIO	1.498	3.891	74582	1.864	5.476	11871	1.979	4.645	22500	3.142	7.759	151634
SALESGR	0.093	443.853	50093	0.022	8.052	7686	-0.074	65.155	15827	-0.014	58.085	96335
TDA	0.640	22.969	86675	0.653	5.140	13561	0.638	10.176	25922	1.434	91.442	171990
SDA	0.527	11.907	86675	0.317	3.370	13561	0.477	9.522	25922	0.686	21.085	171990
LDA	0.113	1.629	86675	0.335	3.578	13561	0.160	2.476	25922	0.747	88.002	171990
STDTD	0.770	0.319	72240	0.511	0.419	11087	0.699	0.351	20086	0.730	0.380	116064

Variable	Sector 8			Sector 9			Manufacturing			Service		
	Mean	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**
ROA	0.070	5.610	59876	0.232	26.019	86194	0.097	14.636	224231	0.057	29.096	357642
ROCE	11.633	81.238	54799	23.231	119.293	75163	22.808	96.402	196463	26.428	124.776	310210
LOGSALES	6.717	1.868	11931	6.602	2.283	40538	8.469	1.841	154818	7.006	2.266	201024
LOGSIZE	4.433	3.206	83336	3.336	3.488	158719	5.991	3.680	294206	4.115	3.681	573089
GEARINGRATIO	177.418	641.573	26020	274.527	863.731	39730	224.228	679.083	182677	303.429	882.086	194975
LIQUIDITYRATIO	6.898	12.242	51985	5.001	10.488	75184	1.722	4.302	192520	4.080	9.250	313262
SALESGR	-0.017	7.127	8789	-0.059	14.534	30399	0.0564	436.905	128903	-0.092	50.087	159157
TDA	0.239	4.648	59876	0.613	21.431	86194	0.561	17.879	224231	0.948	64.393	357642
SDA	0.125	2.280	59876	0.473	21.338	86194	0.396	14.788	224231	0.512	18.211	357642
LDA	0.113	4.018	59876	0.139	1.828	86194	0.164	10.017	224231	0.436	61.081	357642
STDTD	0.578	0.422	24087	0.684	0.396	42934	0.746	0.328	185832	0.689	0.393	214258

Sector 1=Agriculture forestry and mining, Sector2=Manufacturing, Sector3= Construction, Sector4=Wholesale retail and trade, Sector5=Hotels and Restaurants, Sector6=Transport and communication, Sector7=Business and Service, Sector8=Education, health and social work, Sector9= Other

Panel B: Correlation matrix

Variable	ROA	ROCE	SALESG	LOGSIZE	LOGSALES	LIQUIDITY	GEARINGRATI	TDA	SDA	LDA	STDT
ROA	1										
ROCE	0.8101	1									
SALESGR	0.0003	0.0003	1								
LOGSIZE	0.1669	0.2254	-0.0065	1							
LOGSALES	0.0989	0.1150	0.0159	0.7930	1						
LIQUIDITYRAT	-	-0.0232	-0.0034	-0.0357	-0.1803	1					
GEARINGRATI	-	-0.0100	0.0006	0.0242	-0.0245	-0.0490	1				
TDA	-	-0.0438	0.0013	0.1054	-0.0391	-0.1574	0.4773	1			
SDA	0.0439	0.0322	0.0001	0.0192	-0.0037	-0.2037	0.3680	0.7515	1		
LDA	-	-0.1037	0.0017	0.1326	-0.0535	0.0287	0.2361	0.5197	-0.1729	1	
STDTD	0.0421	0.1082	-0.0032	-0.1209	0.0203	-0.0632	-0.0556	-0.1833	0.3993	-0.7714	1

5.7.1 Panel data estimation

The panel data estimation uses variants of equations and all the available yearly observations from 1998-2008 for all firms as explained in 5.3.2. The estimation is done using 2SLS fixed effect. The analysis is based on variants of equations (5.3) and (5.4) incorporating alternative proxies to measure profitability[99] (ROA, ROCE), leverage [TDA (LDA+ SDA), GEARINGRATIO] and size (LOGSIZE). As can be seen in the variable definition Appendix 5A there two alternative measures for profitability, two main alternative measures for leverage and two alternative measure for size of the firm. On the top of that we have 9 sectors and we have classified the sectors in two as manufacturing and service. Thus there are 14 different variations of equation (5.1) and 14 different variations of equation (5.2). The result of the panel estimation is given in Table 5.3. The results are organized in four different panels. Panel A represent all the Total sample estimations for ROA, Panel B represent all the Total sample estimations for ROCE, Panel C and Panel D shows all 9 Sector estimations and the other sector classification, manufacturing and service for alternative measures of profitability and leverage.

[99] This is extremely important as we can separate the fundamental earning power of the company from the effects of management financing decision. For instance, firms with identical EBIT may have different net income depends on the different level of debt finance they employ in the capital structure.

Table 5.3: Panel regression for the period 1998-2008
Panel A: Total Sample; Dependent is ROA

Variables	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-0.5976	0.0000***	-0.6466	0.0000***	-0.7285	0.0000***
LIQUIDITYRATIO	-0.0157	0.0000***	-0.0116	0.0000***	-0.0166	0.0061**
LOGSIZE	0.0572	0.0000***	0.0605	0.0000***	0.0612	0.0000***
GEARINGRATIO	-0.0184	0.0000***				
TDA			-0.0642	0.0000***		
SDA					0.0641	0.0085**
LDA					-0.0509	0.0496**
SALESGR	0.0076	0.9185	0.0080	0.1177	0.0073	0.3195
STDTD	0.0039	0.0148**	0.0043	0.0221**	0.0035	0.0471**
Adjusted R 2	0.846		0.847		0.752	
Observations	170232		178232		181157	

*,**,*** indicates statistically significant at 10%, 5% and 1% respectively. As far as the diagnostic tests are concerned we find no evidence of heteroskedasticity according to White test. Test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation.

Panel B: Total Sample; Dependent is ROCE

Variables	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-21.1456	0.0000***	-2.4499	0.6043	-8.0097	0.0098**
LIQUIDITYRATIO	-0.1539	0.0001***	-0.2177	0.0348**	-0.1189	0.0010**
LOGSIZE	5.3080	0.0000***	1.4102	0.0143**	8.0897	0.0008**
GEARINGRATIO	-0.0573	0.0000***				
TDA			-0.0313	0.0093**		
LDA					-0.0592	0.0003***
SDA					0.0471	0.0089**
SALESGR	0.0016	0.8989	0.0002	0.7485	0.0021	0.6720
STDTD	11.0195	0.0000***	22.9783	0.0000***	18.4370	0.0000***
Adjusted R 2	0.498		0.265			0.429
Observations	167446		205005			204639

*,**,*** indicates statistically significant at 10%, 5% and 1% respectively. As far as the diagnostic tests are concerned we find no evidence of heteroskedasticity according to White test. Test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation

Panel C: Estimations for sectors. Dependent variable is ROA

	Sector 1		**Sector 2**		**Sector 3**		**Sector 4**		**Sector 5**		**Sector 6**	
Variables	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**
C	-181.8214	0.0000***	-72.6017	0.0000***	23.8582	0.1956	-0.0765	0.0005***	28.5479	0.2571	49.0573	0.0041**
LIQUIDITYRATIO	0.2486	0.6416	0.0105	0.9441	-0.7701	0.2248	0.0013	0.0061**	0.1316	0.6665	-0.1192	0.7718
LOGSIZE	21.4768	0.0000***	10.1820	0.0000***	1.2013	0.5958	0.0020	0.0000***	1.6742	0.5758	3.6678	0.0665*
GEARINGRATIO	-0.0072	0.0003***	-0.0100	0.0000***	-0.0126	0.0000***	-2.17E-05	0.0000***	-0.0010	0.3893	-0.0049	0.0006***
SALESGR	0.1251	0.4885	0.0230	0.2625	0.0001	0.7906	0.0005	0.0010***	0.1221	0.7489	-0.0059	0.5225
STDTD	--20.0951	0.0042**	-4.4887	0.0099**	-18.2190	0.0000***	0.0009	0.0016**	-5.2659	0.1762	9.0926	0.0180**
Adjusted R-squared	0.441		0.343		0.552		0.531		0.527		0.407	
observations	2521		36141		13660		33546		4577		9561	
F Statistics	17.56***		13.23***		15.11***		15.65***		16.18***		15.10***	
	Sector 7		**Sector 8**		**Sector 9**		**Manufacturing**		**Service**			
Variables	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**		
C	-27.1859	0.0014**	71.5956	0.0095**	-30.9878	0.0000***	0.0523	0.0661*	0.0533	0.2259		
LIQUIDITYRATIO	-0.1917	0.1717	-0.1691	0.6140	-0.4140	0.1203	0.0013	0.0133**	-0.0015	0.0332**		
LOGSIZE	6.9345	0.0000***	6.8868	0.0523*	7.8359	0.0002***	0.0070	0.0344**	0.0131	0.0156**		
GEARINGRATIO	-0.0015	0.0355**	-0.0051	0.0080**	-0.0040	0.0036**	-2.72-05	0.0000***	-3.05E-05	0.0000***		
SALESGR	0.0578	0.0000***	-0.9885	0.2990	0.1029	0.1941	9.84-07	0.6175	0.0002	0.0000***		
STDTD	16.2563	0.0000***	19.6104	0.0020**	12.5026	0.0020**	-0.00095	0.8703	0.0057	0.6126		
Adjusted R-squared	0.529		0.476		0.507		0.9586		0.445			
observations	50021		4375		13344		86312		83953			
F Statistics	14.92***		16.23***		14.88***		15.19***		16.06***			

Sector 1=Agriculture forestry and mining, Sector2=Manufacturing, Sector3= Construction, Sector4=Wholesale retail and trade, Sector5=Hotels and Restaurants, Sector6=Transport and communication, Sector7=Business and Service, Sector8=Education, health and social work, Sector9= Other. *,**,*** indicates statistically significant at 10%, 5% and 1% respectively. As far as the diagnostic test are concerned we find no evidence of heteroskedasticity according to White test. Test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation

Panel D: Estimations for sectors. Dependent variable is ROCE

Variables	Sector 1		Sector 2		Sector 3		Sector 4		Sector 5		Sector 6	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-163.1484	0.0000***	-74.4447	0.0000***	53.1800	0.0016***	-22.7189	0.0153*	55.5192	0.0248*	49.0573	0.0041**
LIQUIDITYRATIO	0.0922	0.0677*	0.3281	0.0093**	-1.8385	0.0000***	0.1088	0.5732	0.0419	0.8667	-0.1192	0.7718
LOGSIZE	22.2320	0.0000***	12.1102	0.0000***	0.7687	0.7223	4.9401	0.0000***	4.2406	0.1590	3.6677	0.0665*
GEARINGRATIO	-0.0089	0.0143**	-0.0060	0.0000***	-0.0081	0.0000***	-0.0095	0.0000***	-0.003	0.7693	-0.0049	0.0006***
SALESGR	0.0507	0.7712	0.0081	0.9378	0.0002	0.7489	0.0005	0.4231	0.2259	0.4303	-0.0058	0.5225
STDTD	-39.7903	0.0002***	-43.0535	0.0000***	-40.9743	0.0000***	6.3709	0.0016**	-5.0419	0.4462	9.0925	0.0180**
Adjusted R-squared	0.478		0.357		0.553		0.417		0.526		0.407	
observations	2764		38125		14615		33279		4577		9561	
F Statistics	15.28***		13.88***		16.81***		14.55***		15.98***		14.20***	

Variables	Sector 7		Sector 8		Sector 9		Manufacturing		Service	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-25.7639	0.0002***	58.0832	0.0087**	-27.1682	0.0849*	-35.904	0.0000***	-12.917	0.0476**
LIQUIDITYRATIO	-0.1917	0.1717	-0.1397	0.5496	-0.8467	0.1890	0.0125	0.9159	-0.2216	0.0376**
LOGSIZE	6.9345	0.0000***	7.9326	0.0610*	8.1956	0.0001***	6.5356	0.0000***	4.8799	0.0000***
GEARINGRATIO	-0.0015	0.0355**	-0.0078	0.0059**	-0.0068	0.0089**	-0.0099	0.0000***	-0.0024	0.0000***
SALESGR	-0.0578	0.0000***	-0.7320	0.9674	0.1890	0.2980	8.38E-05	0.8438	0.0312	0.0001***
STDTD	16.2563	0.0000***	11.4931	0.0038**	9.8905	0.0043**	-7.6862	0.0000***	14.3604	0.0000***
Adjusted R-squared	0.548		0.525		0.573		0.444		.518	
observations	49912		4467		12872		85601		81878	
F Statistics	15.42***		14.37***		14.66***		14.90***		15.26***	

Sector 1=Agriculture forestry and mining, Sector2=Manufacturing, Sector3= Construction, Sector4=Wholesale retail and trade, Sector5=Hotels and Restaurants, Sector6=Transport and communication, Sector7=Business and Service, Sector8=Education, health and social work, Sector9= Other. *,**,*** indicates statistically significant at 10%, 5% and 1% respectively. As far as the diagnostic test are concerned we find no evidence of heteroskedasticity according to White test. Test for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null of no serial correlation.

In panel A and B of Table 5.3 the estimated coefficient on ROA and ROCE are highly significant in all cases.

The variable firm size measured by LOGSIZE is always highly significant with positively signed estimated coefficients in all the estimations. Firm profitability is positively associated with firm size, so that large size seems to favor the generation of profitability. This is same for the both measures of size. Increase in profitability with the size of the firm support the earlier findings by Miller(1977), Fama and French(1998), Deloof (2003), Abor(2005), Teruel and Solano(2006) and Abor(2007).

The estimated coefficient for the leverage ratio is negative and highly significant. The two alternative variables GEARINGRATIO and TDA are significant at 1% and 5% level in all estimations. The negative sign is consistent with the literature[100.] Firms that become highly geared may tend to suffer, as the proportion of gross profits dedicated to servicing debt increasing and proportion allocated to the shareholders shrinks accordingly. Benito and Vlieghe (2000) found that one third of firms classified as highly geared recorded relatively low profitability for UK firms for the period of 1974-1998.

Liquidity ratio is negative for all the estimations of ROA and ROCE. Further it is significant at 1% or 5% level for ROA and ROCE. There is evidence that lack of liquidity has been an

[100] See Abor(2007) Goddard et al(2005)and Abor(2005).

important cause of business failure. Higher the liquidity lower the profitability confirms the negative correlation between net profit to assets and earnings before interest and tax to capital employed. A survey conducted by the society of practitioners of insolvency (1999) reveals that lack of working capital and non-paying debtors are increasingly cited by companies as the primary reason for failure.

Sales growth shows positive relationship with the profitability. It is not significant in any of the estimations except for some sectors. Sales growth which could be an indication of a firm's business opportunities is an important factor allowing firms to enjoy improved profitability. Here the sign of sales growth is positive in all of the estimations for total sample for both estimations of ROA and ROCE. This is consistent with the previous findings of Deloof(2003), Abor(2005), Teruel and Solano(2006) and Abor(2007).

The variable which measures the impact of short term debt on profitability is highly significant in all the estimations and it is negatively correlated with the profitability. These findings are not consistent with the Fama and French (1998) and Abor (2007).

Panel C and D show the estimated results for different sector classifications on the profitability measure of ROA and ROCE. Panel C shows the estimation results for the estimated coefficient on the profitability measure of ROA for all 9 sectors and other sector classification of manufacturing and service. All the variables are highly significant and all the variables show the expected relationship with the dependent variable in sector 4(Wholesale

retail and trade) for one measure of profitability (ROA). None of the variables in sector 5(Hotel and Restaurants) are significant. In sector 3(Construction) only three variables are significant and show the expected relationship with the profitability. All other sectors (except sector 3 and 5) show more variables are significantly correlated with the profitability.

LIQUIDITYRATIO[101] shows positive or negative relationship with profitability and it is significant only in sector 4. LOGSIZE is highly significant in sector 1,2,4,7 and 9 and weakly significant in sector 6 and 8. This variable shows positive relationship with the profitability as predicted. GEARINGRATIO is highly significant and negatively correlated with the profitability for all sectors. Only in sector 5 it is insignificant but shows a negative correlation. In this estimation SALESGR which measures the sales growth of the firm shows the expected relationship as well as it is highly significant in sector 4 (Wholesale Retail and Trade) and 7 (Business and Service). STDTD shows positive correlation with profitability in all sectors except sector 1,2, 3 and 5 and it is highly significant in sectors except sector 5(Hotel and Restaurants).

The other classification of sector as Manufacturing and Service shows quite interesting results. LIQUIDITYRATIO, LOGSIZE, GEARINGRATIO and SALESGR show the same correlation with the profitability as expected in both sectors. Except STDTD all other variables are significantly affect the determinant of profitability in service sector. For the manufacturing sector LIQUIDITYRATIO, LOGSIZE and GEARINGRATIO are the

[101] The inconsistent coefficient of liquidity is not uncommon in the literature. See Deloof(2003)

significant variables that determine the profitability. Adjusted R-squared which is 0.95 of Manufacturing sector shows that this model has a greater ability to predict the relationship between profitability and other variables whereas service sector adjusted R squared is 0.44.

Panel D is shown the estimations for the sectors and the estimated coefficient on the firm profitability measure is ROCE. As shown in panel C, this estimation also shows that none of the variable in sector 5 (Hotels and Restaurants) is not significant. LIQUIDITYRATIO is highly significant only in sector 2 and 3 and weakly significant in sector 1. LOGSIZE variable is highly significant in sector 1, 2, 4, 7 and 9 and weakly significant in sector 6 and 8. Firm size is not a significant factor in determining profitability in sector 3 (Construction) and 5 (Hotels and Restaurants) in this estimation. Firm size is consistently positively linked to the dependent variable. Firm leverage is also negatively correlated with the dependent variable and highly significant in all sectors apart from sector 5(Hotels and Restaurants). SALESGR shows positive correlation with ROCE as expected. SALESGR is positively correlated and highly significant in sector 7 (Business and Service) whereas all other sectors show insignificant relationship. STDTD is highly significant and shows positive as well as negative relationship with the ROA and ROCE for some sectors.

All the variables in service sector are highly significant and all variables show the expected relationship with the dependent variable. Manufacturing sector shows a positive SALESGR but not significant. As can be seen in the estimation LIQUIDITYRATIO shows negative correlation in Service sector and positive correlation in Manufacturing sector. Higher the liquidity lowers the profitability in Service sector which implies that the most profitable

investment for company is normally in its fixed assets, the least profitable investment is cash. The positive relationship with profitability in Manufacturing sector shows that the past performance of the company enhance the profitability. LOGSIZE is highly significant in both sectors and positively correlated with profitability. GEARINGRATIO is negatively related and highly significant in both sectors.

The panel procedure produces stronger evidence in support of the concept that firm size is an important determinant of profitability. Even in the sector estimations show that size plays an extraordinary role in determining profitability. In all the estimations LOGSIZE show a positive association with the profitability.

LIQUIDITYRATIO does not show a consistent relationship with profitability especially in the different sectors. This could be interpreted as the LIQUIDITYRATIO shows the past performance of the firm and it effect the profitability positively in one industry and negatively in other industry.

GEARINGRATION is always negative and consistent with the previous[102] research studies. The firms that become highly geared may tend to endure as the proportion of gross profit dedicated for servicing debt increases. The coefficient of return on assets (ROA) and return on

[102]Most papers conclude this, for instance, the studies of Ozkan(2001) and Hall et al(2004), for British enterprises and the study of De Migual and Pindado (2001) for Spanish companies. Godadard et al(2005) investigate the determinants of profitability for manufacturing and service sector firms Belgian, France, Italy and UK and in their study they found the same relationship with profitability and gearing ratio.

capital employed (ROCE) confirm the inverse relationship between profitability and leverage, a more profitable company will have less leverage which is supported the pecking order hypothesis, which suggest that firms prefer to use internal equity to external funds. Arcas and Bachiller (2008) found that British firms have less leverage and the reason they explain for that is the British capital market are very developed and these firms will prefer to issue stocks in order to obtain financing.

The variable measuring the growth of the firm, SALESGR is positively related to the dependent variable in almost all the models. In very few sectors it is negaitively related and shows significant relationship with profitability. Furthermore, the sales growth which could be an indicator of a firm's business opportunities is an important factor allowing firms to enjoy improved profitability. As we can see in the positive sign for the variable SALESGR this is consistent with the improvement of sales in period of higher economic growth.

The variable which measures the short term debt to total debt shows positive as well as negative correlation with profitability. For some industries the positive relationship with profitability suggest that short term debt tends to be less expensive and therefore increasing short term debt with a relatively low interest rate will lead to an increase in profitability. This implies that for some industries long term debt is costly than short term debt. On the other hand some industries have a negative correlation among short term debt to total assets and profitability. This is an indication of the fact that short term debt are more expensive and employing more of them lead to low profitability. Long term debts are less expensive for those firms. Overall SMEs in the UK find short term debt is more profitable than long term

debt. Summary results for the empirical analysis which is discussed above shown in Appendix 5C.

5.8 Conclusion

This study has examined the relationship between capital structure and the profitability of non-financial SMEs in the UK for the period of 1998-2008. As illustrated in the previous section the factors influencing profitability in other countries have similar influence on the non-financial SMEs in the UK for the period of 1998-2008 and the results seem to support the predictions.

The results show a significant relationship with capital structure and profitability which is negatively related. The size of the firm appears more important factor that determines the profitability in SMEs in the UK. There is consistent evidence for positive size- profitability relationship.

The estimation results indicate a negative correlation with the profitability and gearing ratio for both measures of profitability. The same relationship is shown for the other measure of leverage (TDA) and profitability for all estimations and the results also statistically significant. This is an indication that SMEs in the UK turn into more highly geared may tend to experience less profit proportion for owners which is not consistent with the theory that says higher the risk greater the return. But this is consistent with the agency theory because higher the leverage greater the agency cost of outside debt. However in terms of Long -term

debt and total assets (LDA) the results shows statistically significant negative relationship with profitability while short -term debt to total assets (SDA) shows a positive relationship with profitability. This implies that profitable firms use more short term debt to finance their operations. So that short term debt plays an extraordinary role in financing operations of SMEs in the UK. This could be the reason that use of expensive debt create agency problems and which could result in negative relationship with profitability. This is confirmed (Arbor 2007) and Gleason et al (2000).

Liquidity refers to a firm's ability to meet its short-term financial obligations. The estimation results show negative relationship with profitability[103] for total sample and negative as well as positive relationship with profitability for sector classification. The negative relationship between profitability and liquidity ratio which could be an implication of the past performance where less profitable firms granting incentives their customers or may be the negative sales growth declines profit and increase the stock levels. It is possible for a firm to go bankrupt if it has lot of cash but no profit and vice versa. As available cash will have to be used to finance the losses and assets of the company will have to shrink because there will be insufficient funds to replace them. This can be caused by declining sales leading to lower profits and higher the level of inventory. Further, the negative relationship could be consequence of firms with less risk, and hence lower profits. This implies the inefficiency of the management as well.

[103] This is consistent with Terual and Solano (2007).

For the difference sectors liquidity ratio gets negative correlation as well as positive. Statistic output points out that profitability is impacted to a high extent by solvency and liquidity. This does imply that the Education, health and social work sector all estimations are negatively correlated with profitability while the other industries like Agriculture forestry and mining, Manufacturing, Wholesale retail and trade, and Hotels and Restaurants seem to be positively correlated. This conclusion is quite interesting that a good liquidity indicator impacts in a positive way on profitability and this creates opportunities in order to bring liquidity into the company. This is evident in the estimation results that most of the sectors in service industry show a negative sales growth which would lead to a negative liquidity. The negative relation between liquidity and profitability is consistent with the view that less profitable firms wait longer to pay their bills.

The analysis suggests that there is a weak link between the sales growth and return on assets and return on capital employed of small firms. This is evident in both the lack of any significant relation between the performance equation for sales growth and ROA and ROCE. Sales growth is positively related with profitability in most sectors and positively correlated in all estimations for the total sample. But this is not an important factor as we find an insignificant relation for the profitability of SMEs in the UK. The implication is the short term increase in growth will have no profitability effect and vice versa. Roper (1999) found the same that number of firm characteristic had the opposite marginal effect on profitability.

The results of this study have shown that the capital structure of the firm has a significant influence on the profitability of SMEs in the UK. Especially long term debt to total assets

ratio negatively related with the profitability and this is an indication that SMEs are averse to use more equity because of the fear of losing the control and therefore employ more debt than in the capital structure that would be appropriate. To avoid agency issues and the problems face in acquiring equity SMEs increase the usage of debt. The interesting results shown in the different sector classification the variable STDTD shows two different relationships with profitability. Manufacturing sector STDTD shows a negative relationship and service sector shows a positive relationship with profitability. This would be an implication that short term debt is profitable for service sector but not for the manufacturing sector. The reason behind this may be that short term debt is expensive for manufacturing sector as the lenders set higher credit terms.

CHAPTER 6

CONCLUSION

6.1 Introduction

We have undertaken a set of studies in this thesis focusing on firm specific and macroeconomic variables on capital structure, cost of debt and profitability of SMEs in the UK. The aim of this concluding chapter is to summarise the main findings of the study, to suggest some possible research ideas for the future research and state the limitations of the study. The first job is to briefly repeat the aim and the approach of each chapter, considering the main results and the conclusions made in each chapter.

6.2 Main Findings

The introduction to the study is given in Chapter 1. In chapter 2 we begin with the introduction and definition and description of various definitions of SME in different countries and theoretical aspects of capital structure. It has been recognized that because of the very nature of the SME, SMEs they are faced by many problems which are less relevant for larger enterprises. The ability to obtain external finance is one of the most significant difficulties pertaining to SME which is indispensable for their development and expansion. In recognition of the importance of SME in the economy and the financing of SME Bank of England has taken into consideration and initiated wide range of endeavors with the aim to ease the seriousness of the issues SMEs experience. The theories of capital structure include the Trade off theory, Pecking order theory and Agency theory. Theoretical aspects of SMEs, Definitions of SME, The difference between SME and Large Business Finance.

Following chapter 2, the remaining 3 chapters are empirical in nature. In chapter 3 a dynamic model is applied to data extracted from FAME database, by way of panel GMM methodology. The data covers 11 years from 1998-2008 and the sample includes 4000 non-financial SMEs in the UK representing 9 sectors. This chapter investigates capital structure determinants and speed of adjustment of SMEs in the UK. Both firm specific and macroeconomic variables are used in modeling. We use dynamic panel data analysis and GMM estimation procedure which allows us to control the firm specific fixed effect where unobservable but is important in determining the capital structure.

We merge two different sets of literature and try to find how firm specific factors, macroeconomic variables and speed of adjustment affect the determinants of capital structure of SMEs in the UK. We find that there is a positive relationship between lag of total debt ratio and debt ratio and it is highly significant and found to be a major determinant of capital structure. This suggests that SMEs in the UK have a target debt ratio and they move towards the target relatively fast. The speed of adjustment is positive and above the average suggests that leverage adjustment in the SMEs in UK occurs quickly. Further size, profitability and FGO have a significant relationship with all measures of capital structure and the results show that all theories of capital structure are similar to the SMEs in the UK. These are factors that outsiders would like to know specially for SMEs to determine whether a firm appears to be financially strong or weak.

Firstly, size provides strong evidence that the positive impact on debt which probably show the control considerations. Particularly, for family owned firms, increasing size through debt

financing is an important factor for controlling purpose. FGO shows positive impact on debt ratio and which is also explains the positive impact of size on leverage. Secondly, profitability is negative and provides strong evidence of having negative impact on leverage which is consistent with the pecking order theory. Thirdly, risk shows that agency cost is lower in risky firms allowing them to have higher leverage. Fourthly, macroeconomic variables show a significant impact on leverage of SMEs and capital structure of SMEs are time dependent. Finally, non-debt tax shield and net debtors are weakly related to the leverage. However, it is noted that this could be due to the improper selection of proxies. To sum up, this study supports the concept of pecking order theory, trade off theory and agency theory and firms have long term target debt ratio and they adjust to the target ratio relatively fast and also macroeconomic variables have an important role in determining capital structure of SMEs in the UK. The major contribution of this study to the existing literature is that adjustment speed of SMEs in the UK is almost similar to that of large firms (see Ozkan, 2001) in the UK and the model accommodates enable us to identify the determinants of optimal capital structure rather than the observed capital structure, the latter being taken in to consideration by the large number of empirical studies.

The last two empirical chapters (Chapter 4 and 5) investigate the determinants of cost of debt and determinants of profitability of SMEs in the UK using the total population which satisfy the EU definition for SME. Chapter 4 studies the factors determining cost of debt capital of non-financial SMEs in the UK. 2SLS regression model applied to estimation of the equation for the data gathered from FAME data base for all active firms for the period 1998-2008. In the first part of this chapter we mainly focus on the theoretical aspect and we discuss theories relating to the cost of debt capital such as agency cost, asymmetric information and trade off

theory. In the empirical section we review some recent empirical studies. These studies suggest that cost of debt determinants of a number of countries are quite similar and although there might be institutional differences among countries.

Further this review explains why the cost of debt for a small business is higher than for other firms. Confirming this idea it is found that the firm size is an important variable in determining the cost of debt of SMEs in the UK. This is consistent with the pecking order theory, trade off theory and control considerations where cost of debt tends to decrease with the size of the firm. In order to measure how the size of the firm affects the cost of debt capital, the sample has been divided in to 3 sub samples as micro, small and medium firms. It is suggested that micro firms cost of capital is higher than other firms and this further implied that asymmetric information and moral hazard which therefore leads to charging a higher interest rate. In addition to that size reflect the reputation of financing choices as smaller the firm lesser the information it produces for the public.

It has appeared that SMEs use more short term finance rather than long term external finance. For the purpose of confirming this, we have interacted short term debt dummy with other variables to determine whether the short term debt plays an important role in SME financing. Indeed, it is cleared that SMEs prefer short term finance due to so many reasons such as no access to long term finance, higher cost compared to large firms, and do not want to share the ownership. In general, the result of this study suggest that size, collateral assets, profit and gearing are important determinants of SMEs short term debt cost.

Chapter 5 is the final empirical chapter and it is used the same data set and same method of equation estimation as chapter 4. This chapter focused the attention on the factors influencing the profitability of non- financial SMEs in the UK. Review of literature shows that capital structure is affected the profitability. In this study we use 2 measures of profitability. The total sample is divided into broad sectoral classification of manufacturing and service as well as all different sectors in order to find if there are any differences in various sectors in factors that determine the profitability.

Descriptive statistics shows that average profitability in the manufacturing sector is higher than in the service sector. As in the previous chapters, in this chapter also it is discovered that size of the firm is strong factors that influence the profitability as well. It is found that highly geared firms' profitability is low which is inconsistent with the theory. In determining profitability also it is proved that short term debt is important. This again confirms the agency problem and resistant to change the ownership of SMEs. Negative relationship with liquidity and sales growth show that past performance of the firm granting incentives to the customers.

More importantly it is found that capital structure of the firm has a significant influence on the profitability of SMEs in the UK. The interesting result shown in this study is that short term debt ratio shows negative relationship with the manufacturing sector and positive relationship with the service sector, implying that short term debt is more profitable for the service sector and short term debt is more expensive for manufacturing sector.

6.3 Policy Implications and Future Research

This section consists of two sub sections. Section 6.3.1 explains the policy implications and section 6.3.2 explains the future research.

6.3.1 Policy Implications

This study has been mainly focused on the factors that affect the financing decisions, cost of debt and profitability. Our finding suggests that firm's attach a lot importance to internal funds. Clearly, the pecking order theory appears to dominate the capital structure, cost of debt and profitability of SMEs in the UK.

Therefore it is important for the policy to be directed at improving the information availability, especially SMEs, should encourage maintaining proper records. SMEs seem reluctant to be transparent and open up involvement of their business to outsiders. Further policy makers can promote linkages between large and small firms in order to support and ensure the survival of small industry which is the main contributor for the UK economy.

As equity capital provides a base for further borrowing, they maintain a good rapport with the business cycle and provide small firms different sources of finance. Policy makers should pay attention on issuing equity capital. For instance, unquoted companies can be encouraged to access the public equity capital by reducing the cost associated with listing and support financially for the flotation cost. Further it is appropriate to establish financing schemes to assist SMEs in specific industries, reducing collateral requirements etc.

6.3.2 Future Research

Overall, our evidence suggests that there appears to be other significant factors that are important. One important research idea is that in addition to the firm specific quantitative variables it is worth and meaningful to incorporate qualitative factors such as Managerial ownership, Management attitudes towards the financial decision making process, etc. The role of qualitative factors in the statistical ratings needs to be analyzed in more depth in future research. This is applicable to all 3 empirical chapters.

The determinants of capital structure are examined in SMEs over a longer period of time in order to elucidate whether capital structure of this sort of companies change along different economic cycles, if we are to understand better capital structure policies in these firms.

Another promising research idea, which is relating to all 3 empirical chapters, is to continue study in more detail the demand side factors. That is the other internal variables that would affect the determinants of capital structure, cost of debt and profitability. In the context of SME there could be some other important internal variables that we haven't considered in here. It will be also useful in the future to incorporate into these studies the analysis of the supply side factors which are related to the characteristics of the financial markets.

According to the World Bank, Doing Business (2011) reports that global crisis drives massive institutional reforms in 2009/2010. Some countries in Europe, Asia and OECD high income group face debt disputes and insolvencies and they reformed their insolvency regimes. It

would be interesting to study the institutional reforms of different countries across Europe as the most of the countries aiming on improving insolvency. Most of the reforms focused on reorganization procedure to ensure the viability of firms and would be interesting to study the impact of institutional reforms in respect to the capital structure.

Further research is necessary in the area of financing practices of family firms and non-family firms as that will contribute to the literature of the behavior different management styles of these firms. This would explain the effect of controlling power on the capital structure as more family owned firms are managed and controlled by the owners. However, our results confirmed that SMEs generally reluctant to share the ownership and use short term debt financing. We are able to explain more about the different financing practices of firms in these two categories as they may use different management style.

To date there has not been any research study done relating to the capital structure of SMEs in Sri Lanka. SME banking concept was introduced in Sri Lanka as private commercial banks reluctant to provide finance and the cost of finance has been one of the major constraints for their operations and for small firms collateral requirements were very high[104]. Therefore, it would be interesting to study the capital structure of SMEs in the context of Sri Lanka and identify what are the specific character differences compared to the UK. Further Sri Lanka is a country which has a different macroeconomic, political and social background from developed economy. Hence, this would contribute to the body of knowledge, how can the

[104] Financial Sector reforms Sri Lanka 2010.

leverage theories which were initially developed based on Western economic orientation apply to an emerging market and understand the financing behavior.

6.4 Limitations

First, as this study is based on SMEs and there is no hard and fast rule[105], some of the firms might have adopted different accounting practices which lead to generate different accounting variables. For instance inventory costing methods such as LIFO and FIFO, different method of depreciation of assets etc. There is no unique method of the variables measured. Titman and Wessels (1988) specify that measurement problems in accounting variables would affect the coefficients.

Second, paucity of data available and its limitations have allowed only a small period for study. It is hoped that in the future more complete data will be available which will cover larger period of time and be more detailed.

Finally, in this study we have focused on single measure of leverage for the purpose of the study. But it would be much more interesting to study the determinants of various components of leverage as specially SMEs we found that highly depend on short term debt. It is very important to understand which source of external finance SMEs mostly use. This could be examined in future research in detail as it shows a more focused and clear-cut idea

[105] International Financial Reporting Standards for SMEs issued by the International Accounting Standard Board are not compulsory to adopt these standards.

about the external financing source of SME. Unavailability of classified data for different sources of leverage restricts us studying this in more detail. This is one of the limitation of this study as well as we have not distinguish between various components of leverage due to the date limitation.

Appendices

Appendix 3A– Theoretical explanation for the methodology

Panel data

While it is possible to use ordinary multiple regression techniques on panel data, they may not be optimal. The estimates of coefficients derived from regression may be subject to omitted variable bias - a problem that arises when there is some unknown variable or variables that cannot be controlled for that affect the dependent variable. With panel data, it is possible to control for some types of omitted variables even without observing them, by observing changes in the dependent variable over time. This controls for omitted variables that differ between cases but are constant over time. It is also possible to use panel data to control for omitted variables that vary over time but are constant between cases. To illustrate it, we have a linear regression model for panel data. To define the model to be estimated, assume we have observations on i=N individuals for each of t = 1,…..,T years. The dependent variable is denoted by yit and the independent variables by X_{it}. The basic panel regression model is

$$y_{it} = X_{it}\beta + \alpha + \varepsilon_{it} \qquad \text{(A3.1)}$$

Where α is the overall intercept and εit is an error term. In this equation, the estimation of the slope coefficient β are average effects of regressors on the dependent variable. However three issues arise here:

1.firm effects: individual firms may differ in their capital depreciation rates, the rate of return, technology, production power, and even in the construction of the accounting measures. The disturbance in the equation may contain a variety of errors of specification.

2. time effect: these differences among individual firms are changing over time.

3. measurement error: the variables in X matrix may be correlated with the error term.

In order to take account of the permanent differences at the firm levels, that may be correlated with output levels across time in 1 and the correlation of regressors with error term, we need to further look at the 'fixed effect' model.

Fixed Effects Regression

The solution to above three problems is to include firm-specific and time-specific effects in the equation. The usual linear regression model in above A3.1 then becomes:

$$y_{it} = X_{it}\,\beta + \alpha_i + \alpha_t + \varepsilon_{it} \qquad \text{(A3.2)}$$

where αi unobserved firm effect , a nuisance parameter which need to be removed from the model, and αt is a time dummy.

The model assumes that there are common slopes, but the each firm has its own intercept: αi which may or may not be correlated with the X.

In order to remove unobservable firm effects, we differentiate A3.2 above. Then we obtain

$$\Delta y_{it} = \beta(\,X_{it} - X_{it}\text{-}1) + (\alpha_t - \alpha_{t-1}) + (\varepsilon_{it} - \varepsilon_{it}) \qquad \text{(A3.3)}$$

This indicates that the estimates of β is inconsistent with because of the correlation between X and ε, including the last two terms in A3.3. Then we cannot estimate this equation by ordinary least square. A general method of obtaining consistent estimates of the parameters in the models is the instrumental variable method. Broadly speaking, an instrumental variable is a variable that is uncorrelated with the error term but correlated with the explanatory variables in the equations. In order to get a consistent estimator for 3, it will be appropriate to instrument it by means of lagged values of the predetermined variables in order to control for

both contemporaneous simultaneity between X and yit and measurement error in the right hand side variables.

GMM Estimator

The GMM for dynamic panel data estimation come from the fact that the object of interest is a function of moment. For the purpose of uncomplicated illustration we will consider a simple linear equation.

$$Y = X\beta + \varepsilon \qquad \text{(A3.4)}$$

Suppose that there is no relationship between independent variable and disturbance and the equation is correctly specified. Then the moment condition will be

$$E(X' \varepsilon) = 0 \qquad \text{(A3.5)}$$

Then the population moment we expect is

$$E[X'(y - X\beta)] = 0 \qquad \text{(A3.6)}$$

Assuming that sample moments of conditions are zero, then we have

$$\frac{1}{n}[X'(y - X\hat{\beta})] = 0 \qquad \text{(A3.7)}$$

Rewriting the above equation, we get method of moment (MoM) estimation

$$\hat{\beta}MoM = (X' X)^{-1} X' y = \hat{\beta}OL\hat{S} \qquad \text{(A3.8)}$$

As we can see above MoM estimator is same as the OLS estimator. Then in (A3.4) we have

$$E(X' \varepsilon) \neq 0 \qquad \text{(A3.9)}$$

Then equation (A3.8) will be biased and to avoid this problem, we have to find instrumental variable Z with correlation with X, the instrument should have a strong correlation with the regression of the model this is called the relevance requirement and uncorrelated with ε, the data should satisfy the orthogonality condition which is called the exogeneity requirement.

Then the new MoM in (A3.8) becomes

$$E(Z\,\varepsilon) = 0 \qquad \text{(A3.10)}$$

Which shows that the instruments are not correlated with the error terms.

Similarly we can get (A3.7)

$$\frac{1}{n}\,[Z'(y - X\hat{\beta})] = 0 \qquad \text{(A3.11)}$$

on the other hand, the number of moment restrictions may be greater than the number of parameters when solving β, we may encounter an over identification problem. To solve this problem one of possibilities is to weigh equally deviations from each condition and minimize the sum of squared deviations.

$$\min_{\beta} \quad \{\frac{1}{n}\,[Z'(y - X\hat{\beta})]\; Wn\; \frac{1}{n}[Z'(y - X\hat{\beta})]\} \qquad \text{(A3.12)}$$

Where X is (n×L), Z is (n×k), $Wn = \{\frac{1}{n}2\ (Z'\Omega Z)^{-1}$ is an (L×L) weighting matrix, with L>k and Ω is the residual[106].

As number of the columns of matrix X is equal to the number of column of matrix Z, then

[106] See J. Johnston (1996) for more details.

β̂GMM = β̂2SLS. From the equation (A3.12), the GMM estimator become

$$\hat{\beta}_{GMM} = [X'Z\ WnZ'X]\text{-}1[X'ZWnZ'y] \qquad \text{(A3.13)}$$

As Johnston (1996) explain that in the presence of heteroskadasitic errors, when Z≠X, the GMM estimator will provide more efficient compared to two-stage least squares estimator.

GMM estimator in the first difference equation

Arellano and Bond (1988) introduced the following equation (A3.14) for the first difference for panel data estimation in the presence of firm effects.

$$\hat{\beta}_{GMM} = \left[\left(\sum_{i=1}^{n} X_i^{*\prime} Z_i\right) W_N \left(\sum_{i=1}^{n} Z_i' X_i^{*}\right)\right]^{-1} \left(\sum_{i=1}^{n} X_i^{*\prime} Z_i\right) W_N \left(\sum_{i=1}^{n} Z_i' y_i^{*}\right) \qquad \text{(A3.14)}$$

Where X* = ΔX and y*= Δy if in the first difference equation and the residuals becomes $\Omega = \hat{v}_i^* \hat{v}^{*\prime}$ where v_i^* are first difference residuals.

This GMM estimator satisfies orthogonality conditions between some functions of the parameters and a set of instrumental variables. Due to following reasons GMM estimates are preferred in the dynamic panel estimations:

1. orthogonality - in the presence of correlation of independent variables, in particular in the first difference model, with the error in the estimation model. GMM estimator is an instrumental variable method to solve this problem using the orthogonality conditions.

2. presence of heteroskedasticity – GMM estimators allow for heteroskedastic disturbances.

3. unbiased estimator- when Cov(X, εt) ≠ 0 in (A3.4), GMM estimator is unbiased while OLS overestimate the parameter while the ML underestimate it (Cho, 1995, Arrelano and Bond, 1994, Hall et al, 1998).

4. robust estimator – GMM, unlike ML and OLS estimations, does not require the exact distribution of the disturbances.

5. generalization - common OLS estimators (2SLS, ML) in econometrics can be considered as special cases of GMM.

Over identification of instrumental variables and Sargan-test.

Previous studies concerning dynamic equations for panel data has emphasized the case where the model with an arbitrary covariance matrix of the errors is identified. The fundamental identification condition in the GMM estimation discussed above is strict exogeneity of some of the explanatory variables or the availability of strictly exogenous instrumental variables, conditional on the unobservable individual effects. In practice, one is likely to assume serial uncorrelation structure of the errors, in which case different identification arrangements become available. This allows one to fully use past present and future values of the strictly exogenous variables to construct instruments for the lagged dependent variable and other non-exogenous variable once the permanent effect have been differenced out. In these cases and also in the models with moving average errors, lagged values of the dependent variable itself become valid instruments in the differenced equations corresponding to later periods.

Sargan tests test the validity of the instrumental variables when we have more instruments than parameters to estimate. For instance, if the number of moment restriction L is greater than the number of parameters, k, i.e., L>k, $\hat{\beta}_{GMM}$ is then over identified. In this case

minimand is also a test statistic for the validity of these restrictions. Under the null that these restrictions are valid, based on (A3.14), sargan-statistic will be

$$Test_{GMM} \equiv \left(\left[Z\left(y - X\,\hat{\beta}_{GMM} \right) \right] W_n \left[Z\left(y - X\,\hat{\beta}_{GMM} \right) \right] \right) \sim x^2(L-K) \qquad \text{(A3.15)}$$

This is to test null hypothesis of the validity of the extra instrumental variables, given that a subset of the instrumental variables is valid and exactly identifies the coefficients in the equation.

Instrumental variables and MA test

We can see from (A3.3), t-1 variables cannot be chosen as instrumental variables due to the possible correlation with t-1disturbance.

In the first differenced equation it is appropriate to use t-2, t-3 or earlier instruments to ensure the instruments to be orthogonal to the moving average error $\Delta\varepsilon t$. If the error term in levels is serially uncorrelated, $\Delta\varepsilon t$. follows MA(1) process, i.e.

$$\Delta\varepsilon t. = \varepsilon t - \varepsilon t\text{-}1 \qquad \text{(A3.16)}$$

Now we can choose t-2 or earlier variables as instrumental variables so that the third term in (A3.3) will be orthogonal to the past history of the regressors and the dependent variables. If the error term in levels is itself MA(1), then $\Delta\varepsilon$, follows MA(2) process i.e.,

$\Delta\varepsilon t. = \varepsilon t - \varepsilon t\text{-}1$

$=(vt + \beta 1 vt\text{-}1) - (vt\text{-}1 + \beta 1 vt\text{-}2)$

$= (vt - (1- \beta)vt\text{-}1 - \beta 1 vt\text{-}2)$

Then the t-3 or earlier regressors or/and dependent variables will be used as instrumental variables. In practice, a statistical test for the first order serial correlation in disturbances (m1 test) and a test for the second order correlation in disturbances (m2 test) were used to detect appropriate lags of instrumental variables (Arellano and Bond, 1991).

Note: The above discussion is entirely based on J. Johnston (1996) and Green (2003).

Appendix 3B -Number of Firms stratified by Years

Year	Number of firms
1998	1710
1999	1943
2000	2215
2001	2527
2002	2774
2003	2967
2004	3109
2005	3274
2006	3642
2007	3930
2008	3984

Appendix 3C- Correlation Matrix

Variable	TDR	LDA	SDA	Size	CA	Profit	OR	FGO	NDTS	Net Debtors
TDR	1									
LDA	0.537	1								
SDA	0.416	0.548	1							
Size	-0.176	-0.264	0.381	1						
CA	-0.438	-0.398	0.324	0.236	1					
Profit	0.027	0.172	0.419	0.093	0.237	1				
OR	0.093	0.381	0.438	0.084	-0.294	0.001	1			
FGO	0.073	0.094	0.226	0.280	0.128	0.265	-0.170	1		
NDTS	0.274	0.298	0.359	-0.087	-0.294	0.294	-0.391	-0.365	1	
Net Debtors	-0.229	-0.328	-0.287	0.151	0.154	-0.225	0.093	0.119	-0.436	1

Appendix 4A- Variable Definitions

Dependent variable

COD	Interest cost /Total debt.

Independent Variables

AGE A dummy variable represent the firm age less than or equal 10 =0 and otherwise 1.

SIZE	Natural log of sales
(SIZE2)	Natural log of total assets
PROFIT	Profit before interest and tax/ Total assets
GEARING	Debt/Equity
CA	Intangible assets/ Total assets
LIQUIDITY	Current assets/Current liabilities
CREDITSCORE	QUI score (0, 1 Dummy variable)

AUDIT DUMMY A dummy variable represent 1 for firms which has unqualified audit report and otherwise 0.

TAX	Taxation/ Profit Before tax
SALES GROWTH	Percentage growth in annual sales.
STDTD	Short term debt over total debt.
DUMMYSTDTD	A dummy variable represent 1 for STDTD=1 otherwise 0.

Appendix 4B- Distribution of sample firms by industry

Two digits SIC code	Number	Industry description	Percentage(%)
01-14	663	Agriculture Forestry and Mining	1.30
15-41	6534	Manufacturing	12.82
45	3027	Construction	5.94
50-52	7002	Wholesale and Retail Trade	13.73
55	1493	Hotels and Restaurants	2.93
60-64	1868	Transport and Communication	3.66
70-75	15392	Business or Services	30.19
80-90	7189	Education health and Social work	14.10
91-99	5784	Other	11.34
	50987	Total*	100

* Unclassified 2035(3.99%)

Appendix 4C- Correlation Matrix

Descriptive Stat-Pairwise Sample												
	AGE	AGEDUMMY	CA	COD	GEARINGRATIO	STD	LOGSALES	LOGSIZE	PROFIT1	LIQUIDITYRATIO	QUISCORE	SALESGR
AGE	1	0.7195	0.0316	0.0713	-0.1192	-0.0970	0.2176	0.4767	0.0101	-0.0267	0.2719	0.0017
AGEDUMMY	0.7195	1	0.0135	0.0873	-0.1390	-0.0490	0.2610	0.4691	0.0420	-0.0459	0.3092	0.0045
CA	0.0316	0.0135	1	0.0234	0.0079	-0.2718	-0.0176	0.0558	-0.0260	-0.0217	0.0158	-0.0057
COD	0.0713	0.0873	0.0234	1	-0.0809	0.0492	0.2671	0.2423	0.0398	-0.0619	0.0894	-0.0098
GEARINGRATIO	0.1192	-0.1390	0.0079	-0.0809	1	-0.0197	-0.0698	-0.0298	-0.0923	-0.0871	-0.1921	0.0009
STD	-0.0970	-0.0490	-0.2718	0.0492	-0.0197	1	0.1919	-0.0278	0.0878	0.0765	0.0008	-0.0067
LOGSALES	0.2176	0.2610	-0.0176	0.2671	-0.0698	0.1919	1	0.8276	0.0793	-0.1873	0.3435	0.0196
LOGSIZE	0.4754	0.4691	0.0558	0.2423	-0.0298	-0.0278	0.8276	1	0.0577	-0.1322	0.3721	-0.0054
PROFIT1	0.0101	0.0420	-0.0260	0.0389	-0.0923	0.0878	0.0793	0.0577	1	0.0567	0.2832	0.0008
LIQUIDITYRATIO	-0.0267	-0.0459	-0.0217	-0.0619	-0.0871	0.0765	-0.1873	-0.1322	0.0567	1	0.0823	-0.0031
QUISCORE	0.2719	0.3092	0.0158	0.0894	-0.1921	0.0008	0.3435	0.3721	0.2832	0.0823	1	0.0018
SALESGR	0.0017	0.0045	-0.0057	-0.0098	0.0009	-0.0067	0.0196	-0.0054	0.0008	-0.0031	0.0018	1

Appendix 4D -Number of Firms stratified by Years

Year	Number of firms
1998	20188
1999	22872
2000	24364
2001	29342
2002	34814
2003	37971
2004	39799
2005	42732
2006	48239
2007	49730
2008	50987

Appendix 4E - Qui Credit Assessment*

Qui Credit Assessment Ltd have extensive experience in the credit industry. The work effects current economic conditions and includes post mortems on failed companies. The credit rating on fame comprises the Qui Score and the Qui Rating.

The Qui Score

A measure of the likelihood of company failure in the twelve months following the date of calculation. The Qui Score is given as a number in the range 0 to 100. For ease of interpretation, that range may be considered as comprising five distinct bands.

81-100 The Secure Band

Companies in this sector tend to be large and successful public companies. Failure is very unusual and normally occurs only as a result of exceptional changes within the company or its market.

61-80 The Stable Band

Here again, company failure is a rare occurrence and will only come about if there are major company or marketplace changes.

41-60 The Normal Band

The sector contains many companies that do not fail, but some that do.

21-40 The Unstable Band

Here, as the name suggests, there is a significant risk of company failure: in fact companies in this band are on average four times more likely to fail that those in the Normal Band

0-20 The High Risk Band

Companies in the High Risk sector are unlikely to be able to be able to continue trading unless significant remedial action is undertaken, there is support from a parent company, or special circumstances apply. A low score does not mean that failure is inevitable.

Interpreting the Qui Score

The Qui Score is based on statistical analysis of a random selection of companies. To ensure that the model is not distorted, three categories are screened out from the initial selection: major public companies, companies that have sort insignificant amounts of unsecured trade credit and liquidated companies that have a surplus of assets over liabilities. The Qui Score is intended to be an aid to the financial part of the overall assessment, and has to be considered in conjunction with other information such as seasonal trends, product life cycles, competition, interest rates and other micro and macro-economic factors. The stability of many companies is reliant of that of holding companies or other associates on which separate enquiries should be made.

The Qui Rating

Acts as a yardstick which assists the calculation of credit limits for routine suppliers.
The basic rating should be modified to reflect factors such as profit margins, stock levels, ability to bear losses and other factors specific to individual users. The Qui Rating can also be used by

purchasers of goods and services as a yardstick for establishing the monthly rate of purchase from suppliers from suppliers. Qui Ratings based on consolidated figures give the position for the group as a whole.

*This is extracted from Qui Credit Assessment[107.]

[107] http://fame.bvdep.com/Fame/help/HelpFame/AQuiCrAs.htm

Appendix 5A- Definitions of variables

ROA=Net profit to total assets.

ROCE=Earnings before interest and tax to capital employed.

LIQUIDITYRATIO=Current assets to current liabilities.

LOGSIZE=Natural log of total assets.

LOGSALES=Natural log of sales.

GEARINGRATIO=Debt to equity.

TDA=Total debt to total assets.

LDA=Long term debt to total assets.

STA= Short term debt to total assets.

STDTD=Short term debt to total debt.

SALESGR=Percentage growth in annual sales.

Appendix 5B -Number of Firms stratified by Years

Year	Number of firms
1998	22859
1999	24853
2000	29719
2001	34921
2002	38279
2003	40540
2004	42872
2005	44387
2006	49543
2007	53732
2008	54183

Appendix 5C: Summary results for the empirical analysis

Panel A and B: Total Sample

Variable	Predicted sign	Estimated coefficient for ROA	Estimated coefficient for ROCE
Liquidity LIQUIDITYRATIO	+ -	Consistently negative and highly significant for total sample	Consistently negative and highly significant for total sample
Size of the firm LOGSIZE	+	Consistently positive and highly significant in all cases	Consistently positive and highly significant in all cases
Leverage GEARINGRATIO TDA	- -	Consistently negatively related to profitability and highly significant. Consistently negatively related to profitability and significant.	Consistently negatively related to profitability and highly significant. Consistently negatively related to profitability and significant.
Growth SALESGR	+	Consistently positive and not significant.	Consistently positive and not significant.
STDTD	+	Positively signed and highly significant.	Positively signed and highly significant.

Panel C and D: Sectors

Variable	Predicted sign	Estimated coefficient for ROA	Estimated coefficient for ROCE
Liquidity LIQUIDITYRATIO	+ -	S1- Positive and not significant S2- Positive and not significant. S3- Negative and not significant. S4-Positive and significant. S5- Positively signed and not significant S6- Negative and not significant S7- Negative and not significant S8- Negative and not significant S9- Negative and not significant M- Positive and significant SER - Negative and significant.	S1- Positively signed and significant. S2- Positive and significant. S3- Negative and significant. S4- Positive and not significant. S5- Positively signed and not significant S6- Negative and not significant S7- Negative and not significant S8- Negative and not significant S9- Negative and not significant M- Positively related and not significant SER-. Negative and significant.

Size of the firm LOGSIZE	+	S1- Positively signed and highly significant S2- Positively signed and highly significant S3- Positively signed and not significant. S4- Positively signed and highly significant S5- Positively signed and not significant. S6- Positively signed and highly significant S7- Positively signed and highly significant S8- Positively signed and highly significant S9- Positively signed and highly significant M- Positively signed and highly significant SER- Positively signed and highly significant	S1- Positively signed and highly significant S2- Positively signed and highly significant S3- Positively signed and not significant. S4- Positively signed and highly significant S5- Positively signed and not significant. S6- Positively signed and weakly significant S7- Positively signed and highly significant S8- Positively signed and highly significant S9- Positively signed and highly significant M- Positively signed and highly significant SER- Positively signed and highly significant.
Leverage GEARINGRAT	-	S1. Negatively signed and highly significant S2- Negatively signed and	S1- Negatively signed and highly significant S2- Negatively signed and

IO		highly significant S3- Negatively signed and highly significant S4- Negatively signed and highly significant S5- Negatively signed and not significant S6- Negatively signed and highly significant S7- Negatively signed and highly significant S8- Negatively signed and highly significant S9- Negatively signed and highly significant M- Negatively signed and highly significant SER- Negatively signed and highly significant	highly significant S3- Negatively signed and highly significant S4- Negatively signed and highly significant S5- Negatively signed and not significant S6- Negatively signed and highly significant S7- Negatively signed and highly significant S8-Negatively signed and highly significant S9-Negatively signed and highly significant M- Negatively signed and highly significant SER-Negatively signed and highly significant
Growth SALESGR	+	S1- Positively signed and not significant. S2- Positively signed and not significant. S3- Positively signed and not significant. S4- Positively signed and	S1- Positively signed and not significant. S2- Positively signed and not significant. S3- Positively signed and not significant. S4- Positively signed and not

		significant. S5- Positively signed and not significant. S6- Positively signed and not significant. S7- Positively signed and significant. S8- Positively signed and not significant. S9- Positively signed and not significant. M-Positively signed and not significant. SER- Positively signed and significant.	significant. S5- Positively signed and not significant. S6- Positively signed and not significant. S7- Positively signed and significant. S8- Positively signed and not significant. S9- Positively signed and not significant. M-Positively signed and not significant. SER- Positively signed and significant.
STDTD	+	S1- Positively signed and significant. S2- Negatively signed and significant S3- Positively signed and significant. S4- Positively signed and significant. S5- Positively signed and not significant. S6- Positively signed and significant. S7- Positively signed and	S1- Positively signed and significant. S2- Negatively signed and significant S3- Positively signed and significant. S4- Positively signed and significant. S5- Positively signed and not significant S6- Positively signed and significant. S7- Positively signed and

		significant. S8- Positively signed and significant. S9- Positively signed and significant. M- Negatively signed and not significant SER- Positively signed and not significant	significant. S8- Positively signed and significant. S9- Positively signed and significant. M- Negatively signed and significant. SER- Positively signed and significant

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